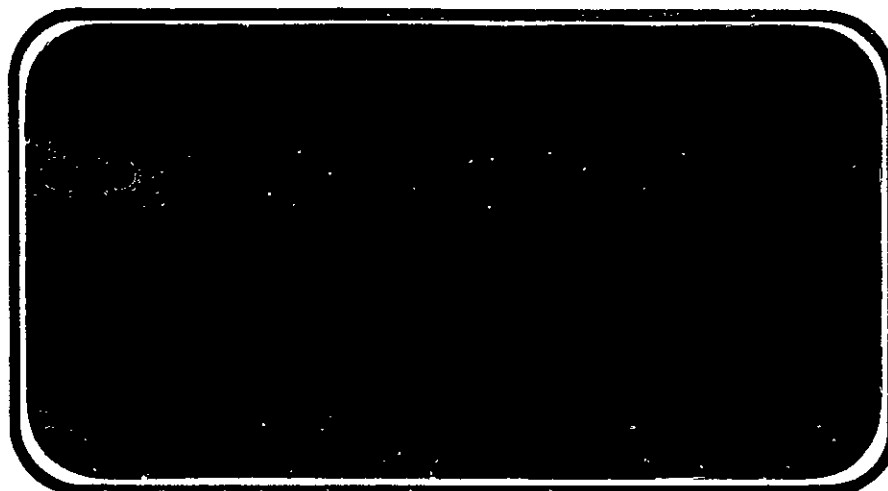




NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

NASA CR-

141828



(NASA-CR-141828) HEAT TRANSFER TESTS ON A
0.01-SCALE ROCKWELL CONFIGURATION 3 SPACE
SHUTTLE ORBITER AND TANK (37-OT) IN THE
CALSPAN 48-INCH HYPERSONIC SHOCK TUNNEL
(OH12/IH21), VOLUME 1 (Chrysler Corp.)

N76-16141

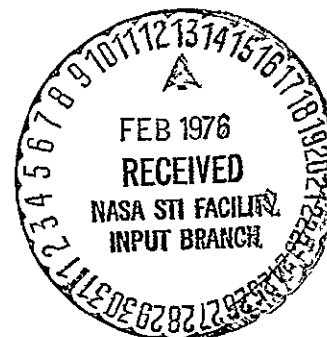
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SPACE SHUTTLE

AEROTHERMODYNAMIC DATA REPORT



JOHNSON SPACE CENTER

HOUSTON, TEXAS

DATA Management services



October, 1975

DMS-DR-2164
NASA CR-141,828

VOLUME 1 OF 3

HEAT TRANSFER TESTS ON A 0.01-SCALE
ROCKWELL CONFIGURATION 3 SPACE SHUTTLE ORBITER
AND TANK (37-OT) IN THE CALSPAN 48-INCH
HYPERSONIC SHOCK TUNNEL (OH12/IH21)

by

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by

Data Management Services
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for

Johnson Space Center
National Aeronautics and Space Administration
Houston, Texas

WIND TUNNEL TEST SPECIFICS:

Test Number: Calspan 48 HST-173-100
NASA Series Number: OH12/IH21
Model Number: 37-OT
Test Dates: October 29 through December 15, 1973

FACILITY COORDINATOR:

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Phone: (716) 632-7500

PROJECT ENGINEER:

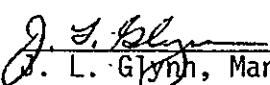
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HEAT TRANSFER TESTS ON A 0.01-SCALE
ROCKWELL CONFIGURATION 3 SPACE SHUTTLE ORBITER AND
TANK (37-OT) IN THE CALSPAN 48-INCH
HYPERSONIC SHOCK TUNNEL (OH12/IH21)

by

M. Kotch, Rockwell International Space Division

ABSTRACT

This report presents model information and data from wind tunnel tests conducted on 0.01-scale models of the Rockwell Space Shuttle Orbiter and External Tank. These tests were conducted in the Calspan 48" Hypersonic Shock Tunnel to determine heating rates on ascent and re-entry configurations at various Reynolds numbers, Mach numbers and angles of attack.

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34	EFFECT OF REYNOLDS NO. ON UNDISTURBED ORBITER WING HEAT TRANSFER ALPHA = 35	2Y/B, RN/L HAW/HT, MACH	E	973-1008
35	EFFECT OF REYNOLDS NO. ON UNDISTURBED ORBITER TAIL HEAT TRANSFER ALPHA = 35	HAW/HT RN/L, MACH	F	1009-1014

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PLOTTED COEFFICIENTS SCHEDULE:

- A) H/H_{REF} versus X/L and HI/HU versus X/L
- B) H/H_{REF} versus X/C and HI/HU versus X/C
- C) H/H_{REF} versus Z/BV and HI/HU versus Z/BV
- D) H/H_{REF} versus X/L
- E) H/H_{REF} versus X/C
- F) H/H_{REF} versus Z/BV

INTRODUCTION

A 0.01-scale orbiter/external tank heat transfer model (number 37-OT) was tested in the Calspan 48" Hypersonic Shock Tunnel from October 29 through December 15, 1973. The NASA/Rockwell designation for this test was OH12/IH21, and the Calspan facility test number was I73-100.

The purpose of this test was to determine ascent and entry heat transfer rates for the external tank and the Configuration 3 Orbiter over a range of Mach numbers from 6.95 to 19.5 and Reynolds numbers/foot from 0.0095×10^6 to 6.5×10^6 . Of particular interest was the determination of orbiter wing leading edge heating during entry, with both laminar and turbulent boundary layer conditions.

A total of 58 good program runs was made out of 73 attempts. Fifteen runs were no good because of facility malfunction or off scale heating rate data. This test is also documented in Reference 2 (a Calspan Technical Report).

NOMENCLATURE

<u>Symbol</u>	<u>Plot Symbol</u>	<u>Definition</u>
b	B	wing span, inches
c	C	local wing chord, inches
C_h		Stanton number $\frac{778 \dot{q}_w}{\rho_\infty U_\infty (rH_o - H_w)}$
h	H	heat-transfer coefficient, $778 (32.17) \dot{q}/(rH_o - H_w)$, lbm/ft ² sec
H		Enthalpy, ft. lbs/slug
L	L	fuselage length, inches
M	MACH	Mach number
OMS		Orbital Maneuvering System
P	P	Pressure, psia
P_r		Prandtl number
q		Dynamic pressure, psia
\dot{q}	QDOT	heat transfer rate, BTU/ft ² sec
RCS		reaction control system
r	HAW/HT	recovery factor
Re/ft	RE/FT	Reynolds number per unit length, $\frac{\rho_\infty U_\infty}{\mu_\infty}$
S		wing span, inches
T	T	temperature, °R
t		time, seconds
U		velocity, ft/sec
X	X	longitudinal distance, inches
Y	Y	spanwise distance, inches

NOMENCLATURE (Continued)

<u>Symbol</u>	<u>Plot Symbol</u>	<u>Definition</u>
Z	Z	vertical distance, inches
α	ALPHA	angle of attack, degrees
β	BETA	angle of sideslip, degrees
γ		specific heat ratio
μ		absolute viscosity, slugs/ft-sec
ρ		density, slugs/ft ³
ϕ	PHI	Orbiter and external tank fuselage angular coordinate, deg. measured clockwise looking forward, 0 degrees at bottom centerline
o		nozzle supply conditions
o'		stagnation conditions behind a normal shock
1		initial driven gas condition
ms		model station
4		gas conditions behind reflected shock
i		incident shock in driven gas
ts		test section initial conditions
w		initial conditions at model surface
∞		free stream or test section conditions
H _{aw}	HAW	adiabatic wall enthalpy
H _t	HT	free stream total enthalpy

NOMENCLATURE (Concluded)

<u>Symbol</u>	<u>Plot Symbol</u>	<u>Definition</u>
h_{ref}	HREF	reference heat-transfer coefficient, value obtained at stagnation point on a one foot diameter sphere
h/h_{ref}	H/HREF	ratio of model heat-transfer coefficient to heat-transfer coefficient of reference sphere for $H_{aw}/H_t = X.XXX$
	HI/HU	interference to undisturbed heat transfer coefficient ratio
	X/C	chordwise location, fraction of local chord
	X/L	longitudinal location, fraction of body length
	2Y/B	spanwise location, fraction of semi-span
	Z/BV	spanwise location on vertical tail, fraction of exposed span
	RN/L	Reynolds number per unit length
	RN/L1, RN/L2, RN/L3	designates the Reynolds number schedule defined by table I

CONFIGURATIONS INVESTIGATED

Model 37-OT is a 0.01-scale model of the Space Shuttle configuration 3 Orbiter and external tank constructed of 17-4 PH stainless steel. The orbiter is a sting mounted full-span model, with OMS/RCS pods. The external tank is equipped with removable protuberances (lines and attachment struts) and was mounted on a separate sting which was either coupled with the orbiter sting or mounted separately on the tunnel support fixture. The figures and photographs at the back of this text illustrate orbiter and external tank details. Model 37-OT was designed and built by Grumman Aerospace Corp. with instrumentation built and installed by Calspan Corporation.

Model nomenclature used for the configuration 3 Orbiter and external tank was as follows:

B ₁₇	Orbiter body
C ₇	Canopy
E ₂₂	Elevon
F ₅	Body flap
M ₄	OMS pod
R ₅	Rudder
T ₁₀	External tank
T ₁₆	External tank without protuberances
V ₇	Vertical tail
W ₁₀₃	Wing

Model dimensional data are given in Table III. Table II outlines model configurations and tunnel conditions investigated. The following configuration notation is used:

CONFIGURATIONS INVESTIGATED (Concluded)

O = Orbiter = B₁₇ C₇ E₂₂ F₅ M₄ R₅ V₇ W₁₀₃

T = external tank = T₁₀

T-NP = external tank without protuberances, support structure, or
lines = T₁₆

MODEL INSTRUMENTATION

Model instrumentation for 37-OT consisted of 158 thin-film heat transfer gages. Ninety-eight (98) of these gages were on the orbiter, the remaining sixty (60) were on the external tank. Orbiter and tank gage locations are illustrated in figure 2 and tabulated in Table IV. Photographs in figure 3 may clarify questions about gauge locations.

The thin-film gages consisted of a platinum film fused to a pyrex insulating substrate and protected from the free stream by a thin dielectric coating of magnesium fluoride. Transient surface temperature is determined by measuring the instantaneous gage resistance change which varied linearly with temperature. An excellent description of thin-film gage theory and operation can be found in Reference 1.

Tunnel conditions were determined by quick-response pressure transducers and a reference stagnation heat-transfer gage.

Data acquisition equipment, provided by Calspan, consisted of the Calspan NAVCOR 48-channel data acquisition system, one 14-channel high-speed FM tape recorder, and twenty-two 2-channel recording oscilloscopes. The NAVCOR system provided both a temperature and heat-transfer rate history for each channel, while the oscilloscopes recorded only heat-transfer rate. This rate was derived from an analog network which converted the gage temperature signal to a heat transfer rate signal. The tape recorder was used only as a temporary storage of temperature histories and was input into the NAVCOR following each run for a record of temperature and heat transfer rate.

MODEL INSTRUMENTATION (Concluded) .

Additional instrumentation consisted of a tunnel Schlieren photograph system, which provided qualitative flow information for each run. Sample Schlieren photographs are included in figure 3.

TEST FACILITY DESCRIPTION

The 48-inch Hypersonic Shock Tunnel (HST) employs a constant-area shock tube with an 8-inch inner diameter. The driver tube is 20 feet long and is externally heated by a resistance heater to temperatures of 1400° R. The driven tube is 50 feet long. The driver gas is generally a mixture of helium and nitrogen with a maximum helium purity of 100% while the driven gas is generally air. Steady-flow test times of duration sufficient to permit accurate measurement of the various parameters of interest are achieved with the tailored-interface technique.

Three axisymmetric nozzles are available to expand the test gas to high velocities:

<u>Nozzle</u>	<u>Type</u>	<u>Exit Diameter in inches</u>	<u>Test Section Mach Number</u>
A	Contoured	24	5.5 to 8
D	Contoured	48	10 to 16
E	10-1/2° Semi-angle cone	48	9 to 20

The contoured nozzles provide parallel flow with no pressure gradients in the streamwise direction for several feet. This is very important since the presence of a streamwise pressure gradient can have a significant effect on model test results. The nozzles employ replaceable throat inserts of different diameters so that with the particular nozzle, the test Mach number can be varied. Test air passes downstream of the test section into a receiver tank of a size sufficient to maintain the desired flow for durations of 5 to 13 milliseconds. All nozzles have been calibrated using pitot-pressure survey rakes over the Mach number range indicated.

TEST FACILITY DESCRIPTION (Concluded)

The Test Section is equipped with two 16-inch diameter Schlieren windows mounted a short distance aft of the nozzle exit.

TEST PROCEDURE

Model 37-0T was mounted via the model sting(s) to the tunnel support fixture at the tunnel centerline. Instrumentation wiring was routed through the base stings to a tunnel instrumentation patch panel. Figures 2a and b show the orbiter alone and the second stage configuration installations, respectively.

A typical test procedure was as follows:

1. Set model angles-of-attack, if necessary.
2. Install tunnel diaphragms and proper tunnel nozzle orifice.
3. Evacuate test section, set instrumentation gains and calibrate oscilloscopes from heating rate estimates, and check gage resistances for weak or damaged gages.
4. Close driver and load driven tube for proper test conditions. Take no-flow Schlieren picture.
5. Load driver to proper mixture and pressure for test conditions.
6. Fire tunnel for run.
7. Evacuate test section for post-run gage checks, then bring test section to atmosphere and break tunnel joints. Read out data.
8. Clean tunnel and inspect model.

DATA REDUCTION

Data for this test were reduced according to standard Calspan data reduction procedures. NAVCOR recordings and Polaroid film oscilloscope records of heat transfer rates were made available after each run. Following the test, all data records were read and assembled for computerized data reduction.

This report contains a listing of heat transfer coefficient H/H_{REF} and heat transfer rate $QDOT$. H/H_{REF} values are presented for three recovery factors $r = .85, .9$ and 1.0 . Plotted data illustrate the effect of recovery factor, angle of attack and Reynolds number on heat transfer. The postscript on RN/L indicates the Reynolds number schedule defined by table I. Heat transfer changes between undisturbed and mated configurations is illustrated by H_I/H_U plots. The plotted and tabulated data are arranged in the following manner:

VOLUME NO.	CONTENTS
1	Plots showing the effect of recovery factor on orbiter and external tank heat transfer for both undisturbed and mated configurations. Figure 4 through Figure 17
2	Plots showing the effect of angle of attack and Reynolds number on the undisturbed orbiter heat transfer Figure 18 through Figure 35

DATA REDUCTION (Concluded)

VOLUME
NO.

3 Tabular listing of source data
H/HREF ~ heat transfer coefficient data

Component	Fourth Character*	Page
orbiter fuselage	B	1
orbiter wing	W	75
orbiter vertical tail	V	180
orbiter wing leading edge (see Detail A fig. 2b)	A	219
orbiter wing leading edge (see Detail B fig. 2b)	C	254
external tank	T	323
QDOT ~ heat transfer rate is arranged in the same manner		365-512

* The fourth character in each dataset identifier (i.e., RUGBXX, B for Fuselage) represents the individual component.

REFERENCES

1. Vidal, R. J., "Model Instrumentation Techniques for Heat Transfer and Force Measurements in a Hypersonic Shock Tunnel," Cornell Aeronautical Laboratory Report No. AD-917-A-7, February, 1956.
2. Patten, J. S., "An Experimental Investigation of the Ascent and Descent Heating on a 0.01-Scale Model of the Space Shuttle," Calspan Technical Report, March, 1974.
3. Foust, J. W., "Pretest Information for Testing the 0.010-Scale Space Shuttle Heat Transfer Model 37-OT in the Calspan Hypersonic Shock Tunnel," SD73-SH-0198, dated July 11, 1973.

TABLE I.

TEST : OH-12, IH-21		DATE : 5/3/74	
TEST CONDITIONS			
MACH NUMBER	REYNOLDS NUMBER (per unit length) (1/Ft)	DYNAMIC PRESSURE (pounds/sq. inch)	STAGNATION TEMPERATURE (degrees Rankine)
6.95	0.10×10^6	1.35	5575
7.6	1.19×10^6	2.75	2000
7.9	6.5×10^6	10.2	1550
8.0	1.19×10^6	3.22	2600
10.2	2.0×10^6	4.03	2725
10.5	0.86×10^6	2.71	3200
12.0(sch 1)	0.20×10^6	0.73	3925
12.0(sch 3)	0.86×10^6	0.26	3475
15.6(sch 1)	0.035×10^6	0.07	3650
15.6(sch 3)	0.20×10^6	0.36	3500
18.5	0.0095×10^6	0.017	4400
19.5	0.035×10^6	0.065	4650
15.6(sch 2)	0.3×10^6	0.61	3841

BALANCE UTILIZED: _____

	CAPACITY:	ACCURACY:	COEFFICIENT TOLERANCE:
NF	_____	_____	_____
SF	_____	_____	_____
AF	_____	_____	_____
PM	_____	_____	_____
RM	_____	_____	_____
YM	_____	_____	_____

COMMENTS:

22

NP denotes ET without protuberances
* Nominal Values-check individual runs for values

Table III Model Dimensional Data

MODEL COMPONENT : BODY - B₁₇

GENERAL DESCRIPTION : Fuselage, 3 configuration, lightweight orbiter

MODEL SCALE: 0.010

DRAWING NUMBER: VL70-000139

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length , In.	<u>1290.3</u>	<u>12.903</u>
Max Width , In.	<u>267.6</u>	<u>2.676</u>
Max Depth, In.	<u>244.5</u>	<u>2.445</u>
Fineness Ratio	<u>4.822</u>	<u>4.822</u>
Area - Ft ²	<u></u>	<u></u>
Max. Cross-Sectional	<u>386.67</u>	<u>3.867</u>
Planform	<u></u>	<u></u>
Wetted	<u></u>	<u></u>
Base	<u></u>	<u></u>

Table III (Cont'd)

MODEL COMPONENT : CANOPY - C₇

GENERAL DESCRIPTION : Configuration 3

MODEL SCALE: 0.010

DRAWING NUMBER: VL70-000139

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length($X_0 = 433$ to $X_0 = 578$), In.	<u>145.00</u>	<u>1.450</u>
Max Width	<u> </u>	<u> </u>
Max Depth	<u> </u>	<u> </u>
Fineness Ratio	<u> </u>	<u> </u>
Area	<u> </u>	<u> </u>
Max. Cross-Sectional	<u> </u>	<u> </u>
Planform	<u> </u>	<u> </u>
Wetted	<u> </u>	<u> </u>
Base	<u> </u>	<u> </u>

Table III (Cont'd)

MODEL COMPONENT: ELEVON - E₂₂GENERAL DESCRIPTION: Configuration 3. Data for 1 of 2 sides.MODEL SCALE: 0.010DRAWING NUMBER: VL70-000;139

<u>DIMENSIONS:</u>	<u>FULL-SCALE</u>	<u>MODEL SCALE</u>
Area - Ft ²	<u>205.52</u>	<u>0.0206</u>
Span (equivalent) , In.	<u>353.34</u>	<u>3.533</u>
Inb'd equivalent chord, In.	<u>114.78</u>	<u>1.148</u>
Outb'd equivalent chord , In.	<u>55.00</u>	<u>0.550</u>
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	<u>0.208</u>	<u>0.208</u>
At Outb'd equiv. chord	<u>0.400</u>	<u>0.400</u>
Sweep Back Angles, degrees		
Leading Edge	<u>0.00</u>	<u>0.00</u>
Tailing Edge	<u>-10.24</u>	<u>-10.24</u>
Hingeline	<u>0.00</u>	<u>0.00</u>
(Product of area & c)		
Area Moment, (Normal to Hingeline), Ft ³	<u>1548.07</u>	<u>0.0015</u>

Table III (Cont'd)

MODEL COMPONENT : BODY FLAP - F₅

GENERAL DESCRIPTION : Configuration 3

MODEL SCALE: 0.010

DRAWING NUMBER : VL70-000139

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length , In. .	<u>84.70</u>	<u>0.847</u>
Max Width, In.	<u>267.6</u>	<u>2.676</u>
Max Depth	<u></u>	<u></u>
Fineness Ratio	<u></u>	<u></u>
Area - Ft ²	<u></u>	<u></u>
Max. Cross-Sectional	<u></u>	<u></u>
Planform	<u>142.5</u>	<u>0.014</u>
Wetted	<u></u>	<u></u>
Base	<u>38.096</u>	<u>0.0038</u>

Table III. (Cont'd)

MODEL COMPONENT : OMS POD - M₄

GENERAL DESCRIPTION : Configuration 3

NOTE: Identical to M₃, except inte section to fuselage.

MODEL SCALE: 0.010

DRAWING NUMBER: VL70-000139

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length , In.	<u>346.0</u>	<u>3.460</u>
Max Width , In.	<u>108.0</u>	<u>1.080</u>
Max Depth , In..	<u>113.0</u>	<u>1.130</u>
Fineness Ratio	<u> </u>	<u> </u>
Area	<u> </u>	<u> </u>
Max. Cross-Sectional	<u> </u>	<u> </u>
Planform	<u> </u>	<u> </u>
Wetted	<u> </u>	<u> </u>
Base	<u> </u>	<u> </u>

Table III (Cont'd)

MODEL COMPONENT: RUDDER - R₅GENERAL DESCRIPTION: Configuration 2A, 3, 3A and 140A/BMODEL SCALE: 0.010DRAWING NUMBER: VL70-000146A, -000095, -000139

<u>DIMENSIONS:</u>	<u>FULL-SCALE</u>	<u>MODEL SCALE</u>
Area - Ft ²	<u>100.15</u>	<u>0.0100</u>
Span (equivalent), In.	<u>201.0</u>	<u>2.010</u>
Inb'd equivalent chord, In.	<u>91.585</u>	<u>0.916</u>
Outb'd equivalent chord, In.	<u>50.833</u>	<u>0.508</u>
Ratio movable surface chord/ total surface chord		
At Inb'd equiv. chord	<u>0.400</u>	<u>0.400</u>
At Outb'd equiv. chord	<u>0.400</u>	<u>0.400</u>
Sweep Back Angles, degrees		
Leading Edge	<u>34.83</u>	<u>34.83</u>
Tailing Edge	<u>26.25</u>	<u>26.25</u>
Hingeline (Product of area & \bar{c})	<u>34.83</u>	<u>34.83</u>
Area Moment (Normal to hingeline), Ft ³	<u>610.92</u>	<u>0.0006</u>
Mean Aerodynamic Chord, In.	<u>73.2</u>	<u>0.732</u>

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Table III (Cont'd)

MODEL COMPONENT : EXTERNAL TANK - T₁₀

GENERAL DESCRIPTION : External oxygen-hydrogen tank, configuration 3

MODEL SCALE: 0.010

DRAWING NUMBER : VL72-000088, VL78-000041

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length (Nose at $X_T = 309$)	<u>1865.0</u>	<u>18.650</u>
Max Width (Dia.), In.	<u>324.00</u>	<u>3.240</u>
Max Depth	<u></u>	<u></u>
Fineness Ratio	<u>5.756</u>	<u>5.756</u>
Area - Ft ²	<u></u>	<u></u>
Max. Cross-Sectional	<u>572.555</u>	<u>0.057</u>
Planform	<u></u>	<u></u>
Wetted	<u></u>	<u></u>
Base	<u></u>	<u></u>
W.P. of Tank Centerline (X_T), In.	<u>400.0</u>	<u>4.00</u>

Table III (Cont'd)

MODEL COMPONENT : EXTERNAL TANK - T₁₆

GENERAL DESCRIPTION : External oxygen-hydrogen tank. Has a 2416-
inch radius secant ogive nose.

MODEL SCALE: 0.010

DRAWING NUMBER : SS-A01167

DIMENSIONS :	FULL SCALE	MODEL SCALE
Length, In. (Nose At $X_T = 276$)	<u>1898.0</u>	<u>18.980</u>
Max Width	<u>324.0</u>	<u>3.240</u>
Max Depth	<u> </u>	<u> </u>
Fineness Ratio	<u>5.858</u>	<u>5.858</u>
Area - Ft ²	<u> </u>	<u> </u>
Max. Cross-Sectional	<u>572.555</u>	<u>0.057</u>
Planform	<u> </u>	<u> </u>
Wetted	<u> </u>	<u> </u>
Base	<u> </u>	<u> </u>
W.P. of tank centerline (Z_T), In.	<u>400.0</u>	<u>4.00</u>
L.E. nose radius	<u>16.5</u>	<u>0.165</u>
Origin of 2416" radius at 2231 from tank centerline	<u>1181.0</u>	<u>11.810</u>

Table III (Cont'd)

MODEL COMPONENT: VERTICAL - V 7GENERAL DESCRIPTION: Centerline vertical tail, doublewedge airfoil with rounded leading edge.NOTE: Same as V₅, but with manipulator housing removed.MODEL SCALE: 0.010DRAWING NUMBER: VL70-000139

DIMENSIONS:	FULL SCALE	MODEL SCALE
TOTAL DATA		
Area (Theo) - Ft ²		
Planform	425.92	0.043
Span (Theo) - In.	315.72	3.157
Aspect Ratio	1.675	1.675
Rate of Taper	0.507	0.507
Taper Ratio	0.404	0.404
Sweep-Back Angles, Degrees.		
Leading Edge	45.000	45.000
Trailing Edge	26.249	26.249
0.25 Element Line	41.130	41.130
Chords:		
Root (Theo) WP	268.50	2.685
Tip (Theo) WP	108.47	1.085
MAC	199.81	1.998
Fus. Sta. of .25 MAC	1463.50	14.635
W.P. of .25 MAC	635.522	6.355
B.L. of .25 MAC	0.00	0.00
Airfoil Section		
Leading Wedge Angle - Deg.	10.00	10.00
Trailing Wedge Angle - Deg.	14.920	14.920
Leading Edge Radius	2.00	0.020
Void Area	13.17	0.0013
Blanketed Area	0.0	0.0

Table III (Conl'd)

MODEL COMPONENT: WING-W₁₀₃GENERAL DESCRIPTION: Configuration 3 orbiter wing.NOTE: Same planform as W₈₇, except dihedral at trailing edge.

MODEL SCALE: 0.010

TEST NO.

DWG. NO. VL70-000139

DIMENSIONS:

FULL-SCALE

MODEL SCALE

TOTAL DATA

Area (Theo.) Ft²

Planform

2690.00

0.2690

Span (Theo) In.

936.68

9.367

Aspect Ratio

2.265

2.265

Rate of Taper

1.177

1.177

Taper Ratio

0.200

0.200

Dihedral Angle, degrees

3.500

3.500

Incidence Angle, degrees

3.000

3.000

Aerodynamic Twist, degrees

3.000

3.000

Sweep Back Angles, degrees

45.000

45.000

Leading Edge

- 10.24

-10.24

Trailing Edge

35.209

35.209

0.25 Element Line

Chords:

Root (Theo) B.P.O.O.

689.24

6.892

Tip, (Theo) B.P.

137.85

1.379

MAC

474.81

4.748

Fus. Sta. of .25 MAC

1136.89

11.369

W.P. of .25 MAC

299.20

2.992

B.L. of .25 MAC

182.13

1.821

EXPOSED DATA

Area (Theo) Ft²

1752.29

9.175

Span, (Theo) In. BP108

720.68

7.207

Aspect Ratio

2.058

2.058

Taper Ratio

0.245

0.245

Chords

Root BP108

562.40

5.624

Tip 1.00 b

137.85

1.379

MAC

393.03

3.930

Fus. Sta. of .25 MAC

1185.31

11.853

W.P. of .25 MAC

300.20

3.002

B.L. of .25 MAC

251.76

2.518

Airfoil Section (Rockwell Mod NASA)

XXXX-64

Root b =

0.10

0.10

Tip b =

0.12

0.12

Data for (1) of (2) Sides

Leading Edge Cuff

120.33

0.012

Planform Area Ft²

560.0

5.600

Leading Edge Intersects Fus M. L. @ Sta

1035.0

10.350

Leading Edge Intersects Wing @ Sta

Table IV.
HEAT TRANSFER GAGE LOCATIONS
ORBITER ($L_{oms} = 12.903$)

FUSELAGE

GAGE NO.	X_m/L_{oms}	X_{oms} (FROM NOSE)	ACTUAL x_{oms}	DESIRED Y_{oms}	ACTUAL Y_{oms}	ϕ
1	0	0	0	0	+0.12	0
2	0.005	.065	.086		.012	
3	0.02	.258	.249		.012	
4	0.04	.516	.539		.020	
5	0.06	.774	.797		.017	
6	0.08	1.032	1.051		.019	
7	0.10	1.290	1.324		.019	
8	0.12	1.548	1.570		.019	
9	0.14	1.806	1.831		.018	
10	0.16	2.065	2.078		.016	
11	0.20	2.580	2.578		.009	
12	0.25	3.226	3.221		.008	
13	0.30	3.871	3.873		.005	
14	0.35	4.516	4.520		.006	
15	0.40	5.161	5.172		.006	
16	0.45	5.806	5.795		.005	
17	0.50	6.452	6.452		.005	
18	0.60	7.742	7.698		.003	
19	0.70	9.032	9.033		.006	
20	0.80	10.322	10.320		.004	
21	0.90	11.613	11.616		.011	
22	1.00	12.903	12.907		.010	
23	0.03	.387	.391		.016	180°
24	0.06	.774	.780		.014	
25	0.09	1.161	1.171		.004	
26	0.125	1.613	1.623		.006	
27	0.15	1.935	1.940		.006	
28	0.130	2.323	2.333		.007	
29	0.160	2.065	2.067		.009	
30	0.170	2.194	2.200		.009	
31	0.50	6.452	6.461		.003	
32	0.70	9.032	9.023		.001	180°
33	0.10	1.290	1.284		.569	30°
34	0.20	2.580	2.593		.638	30°
35	0.30	3.871	3.875	500	.490	---
36	0.40	5.161	5.151	500	.494	---
37	0.60	7.742	7.749	500	.494	---
38	0.80	10.322	10.323	500	.497	---

WING LOWER SURFACE

GAGE NO.	DESIRED X_{oms} (FROM NOSE)	ACTUAL x_{oms}	DESIRED Y_{oms}	ACTUAL Y_{oms}
43	5.161	5.165	1.171	1.159
44	6.451	6.442	↑	1.156
45	7.742	7.750	↓	1.161
46	9.032	9.040	↓	1.166
47	11.613	11.615	1.171	1.163
48	7.742	7.780	1.873	1.930
49	9.032	9.029	↑	1.867
50	10.322	10.322	↓	1.871
51	12.037	12.035	1.873	1.867
52	8.399	8.407	2.342	2.337
53	9.032	9.044	↑	2.332
54	10.322	10.326	↓	2.338
55	11.211	11.219	2.342	2.341
56	9.500	9.499	2.810	2.804
57	10.322	10.322	↑	2.804
58	10.940	10.941	2.810	2.811
59	12.020	12.018	2.810	2.804
60	9.554	9.563	3.513	3.455
61	10.322	10.321	3.513	3.510
62	11.424	11.429	3.513	3.507
63	10.172	10.145	3.981	3.972
64	11.060	11.066	3.981	3.967
65	8.520	8.503	1.373	1.854
66	10.658	10.666	4.449	4.436
67	11.293	11.293	4.449	4.448
68	11.345	11.347	TIP	TIP

WING LEADING EDGE

GAGE NO.	LOCATION		X_{ACTUAL}
	DESIRED	ACTUAL	
69-70	$Y_o = 1.171$	$Y_o = 1.155$	
71-72	$X = 5.160$	$X = 5.164$	
73-74	$X = 6.503$	$X = 6.508$	
75-76	$X = 7.742$	$X = 7.753$	
77-78	$Y_o = 2.342$	$Y = 2.351$	8.332
79-86*	$Y_o = 2.810$	$Y = 2.823$	8.801
89-90	$Y_o = 3.513$	$Y = 3.517$	9.487
91-98*	$Y_o = 3.981$	$Y = 4.033$	10.016
101-102	$Y_o = 4.449$	$Y = 4.466$	10.577

*GAGE NUMBERS 87, 88 & 99, 100 WERE NOT FABRICATED BECAUSE OF SPACE LIMITATIONS.

VERTICAL TAIL

GAGE NO.	DESIRED Z_{oms}	ACTUAL z_{oms}
39	6.096	6.091
40	6.961	6.970
41	7.867	7.861
42	8.157	8.156

Table IV. (Conl'd)
TANK ($L_{tms} = 18.650$)

GAGE NO.	X_{ms}/L_{tms}	X_{ms} (FROM NOSE)	ACTUAL x	ϕ
103	0.00	0	0	—
104	.005	.080	.076	220
105	.01	.186	.196	199
106	.04	.746	.760	180
107	.08	1.492	1.498	↑
108	.15	2.798	2.802	↓
109	.20	3.730	3.744	180
110	.21	3.917	3.932	0
111	.04	.746	.740	180
112	.25	4.663	4.686	↑
113	.35	6.528	6.545	↓
114	.375	6.994	7.009	180
115	.40	7.460	7.478	↑
116	.425	7.926	7.953	↓
117	.45	8.393	8.414	180
118	.475	8.859	8.877	↑
119	.50	9.325	9.341	↓
120	.343	6.397	6.407	225
121	.55	10.258	10.271	180
122	.475	7.572	7.590	193
123	.60	11.190	11.215	180
124	.65	12.123	12.145	↑
125	.70	13.055	13.083	↓
126	.80	14.920	14.940	180
127	.90	16.785	16.818	↑
128	.937	17.475	17.458	↓
129	.406	7.572	7.594	167
130	.15	2.798	2.800	0
131	.44	8.206	8.223	199
132	.08	1.492	1.492	0
133	.475	8.859	8.871	199
134	.50	9.325	9.335	199
135	.90	16.785	16.796	199
136	.40	7.460	7.464	221.5
137	.50	9.325	9.344	↑
138	.60	11.190	11.205	↓
139	.70	13.055	13.073	221.5
140	.80	14.920	14.940	↑
141	.85	15.853	15.882	↓
142	.90	16.785	16.818	214.
143	.825	15.386	15.386	↑
144	.85	15.853	15.874	↓
145	.875	16.319	16.339	241.
146	.90	16.785	16.805	↑
147	.925	17.251	17.280	↓
148	.960	17.904	17.902	247.5
149	.85	15.853	15.874	↑
150	.90	16.785	16.795	↓
151	.20	3.730	3.729	270.
152	.40	7.460	7.465	↑
153	.50	9.325	9.322	↓
154	.60	11.190	11.200	270.
155	.70	13.055	13.066	↑
156	.80	14.920	14.930	↓
157	.90	16.785	16.810	315
158	.60	11.190	11.196	↑
159	.80	14.920	14.930	↓
160	.40	7.460	7.459	0
161	.60	11.190	11.191	0
162	.80	14.920	14.914	0

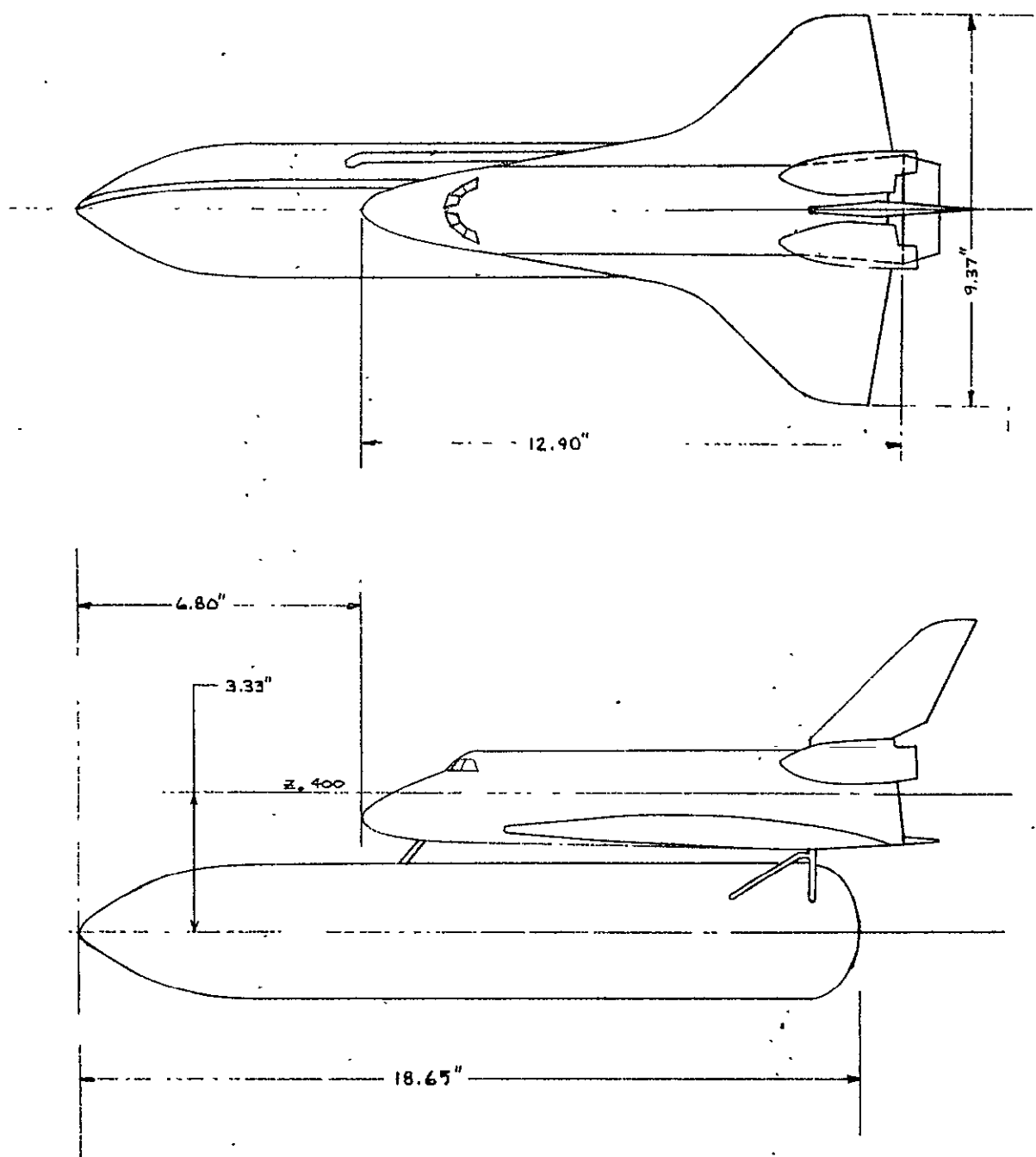
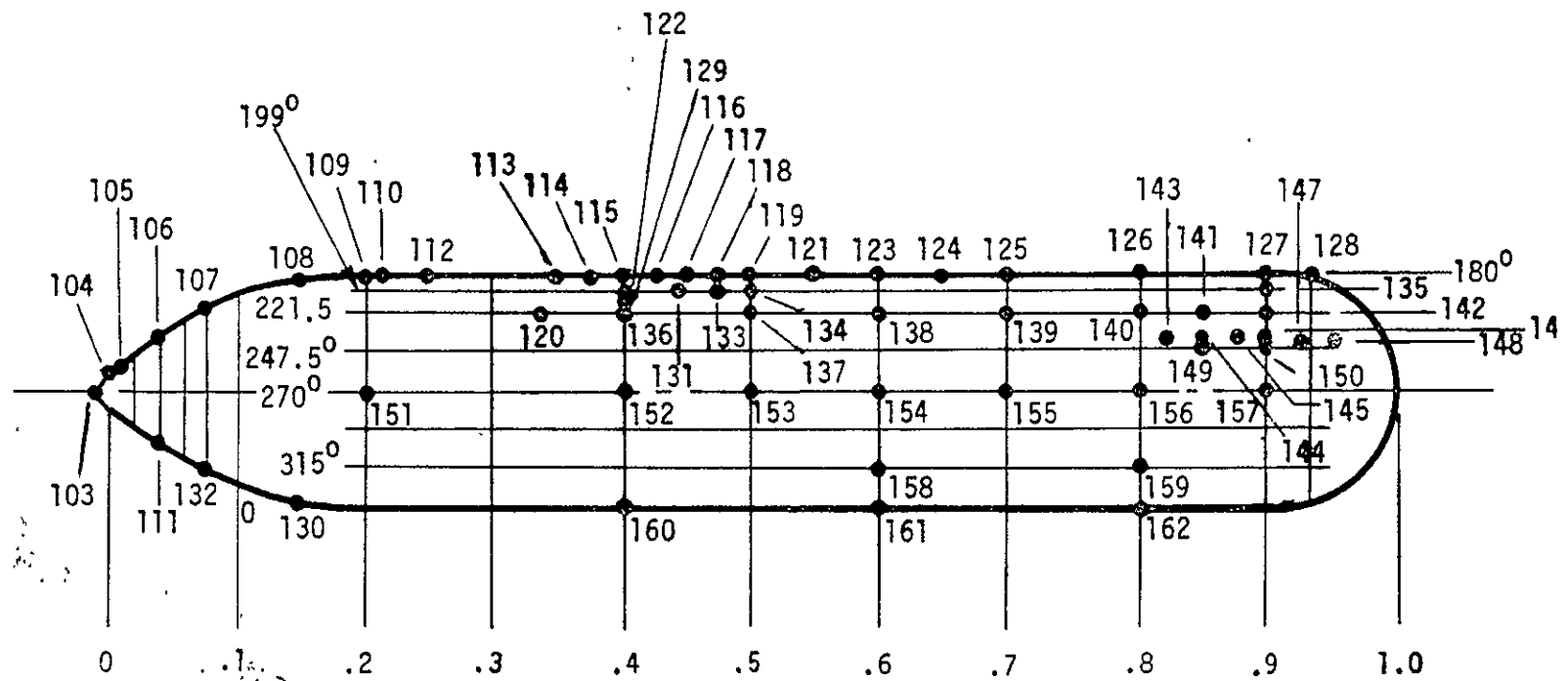
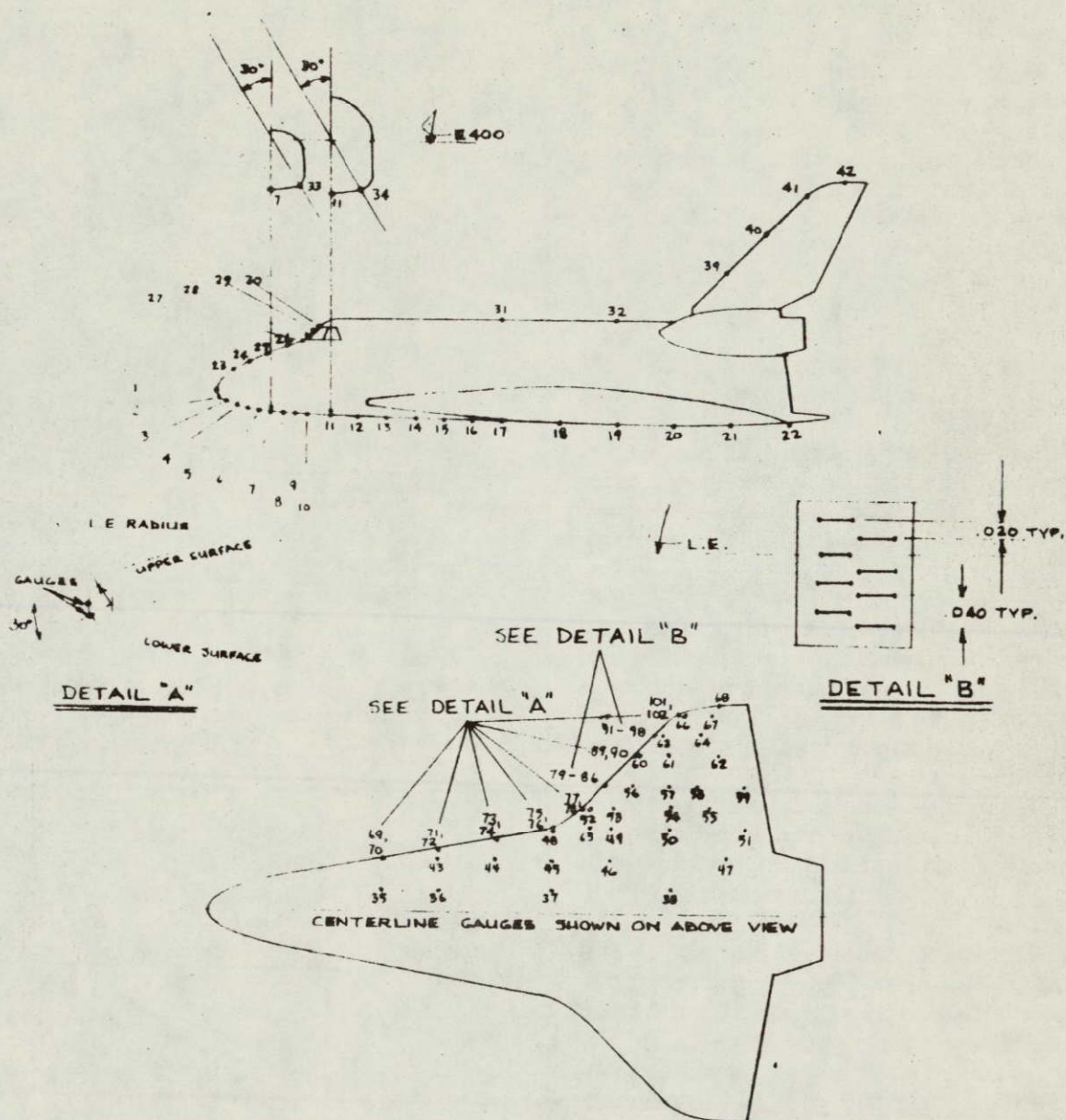


Figure 1. Configuration 3 Orbiter/ET



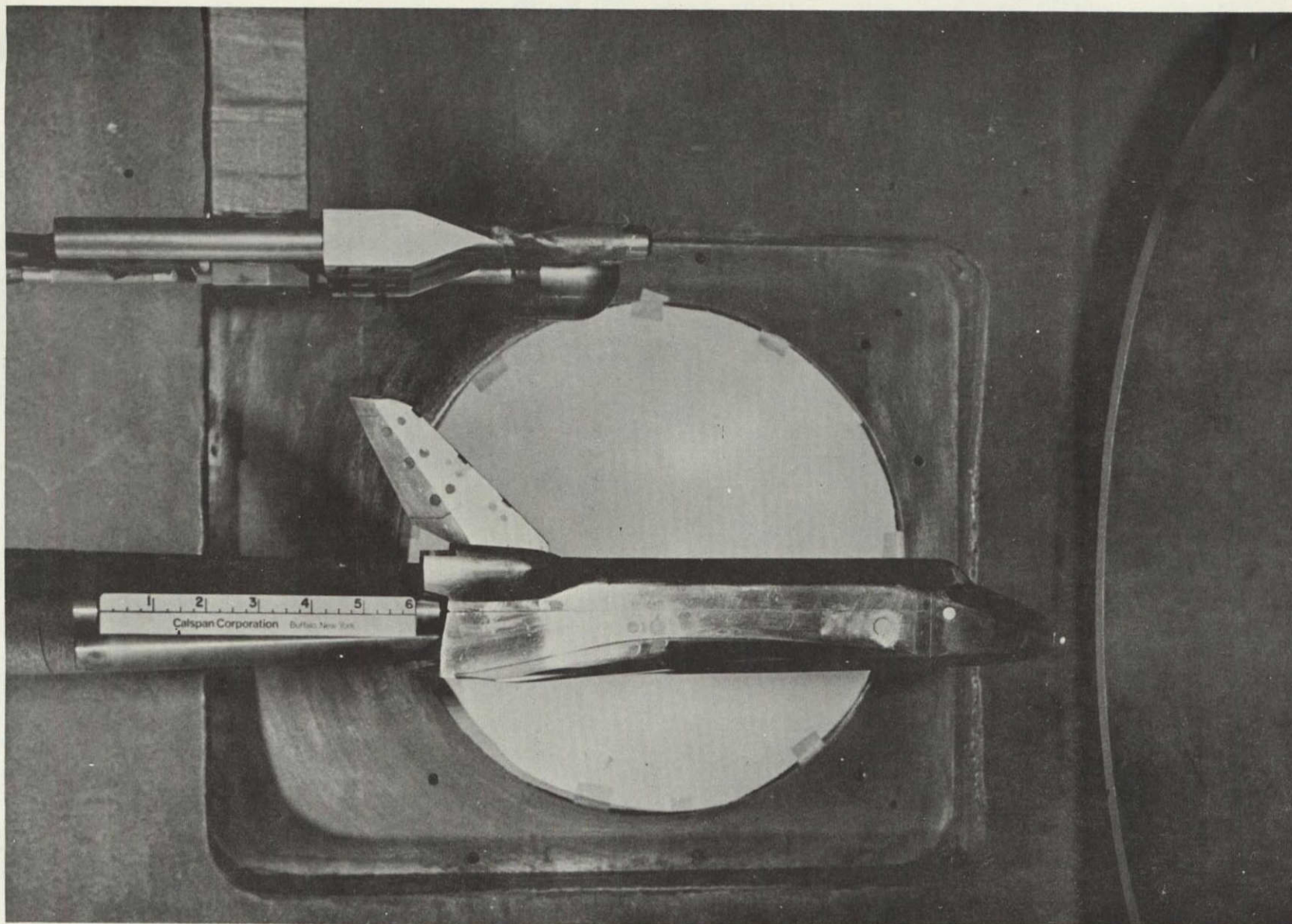
a. Model 37-T. Instrumentation Locations

Figure 2. - Model instrumentation.



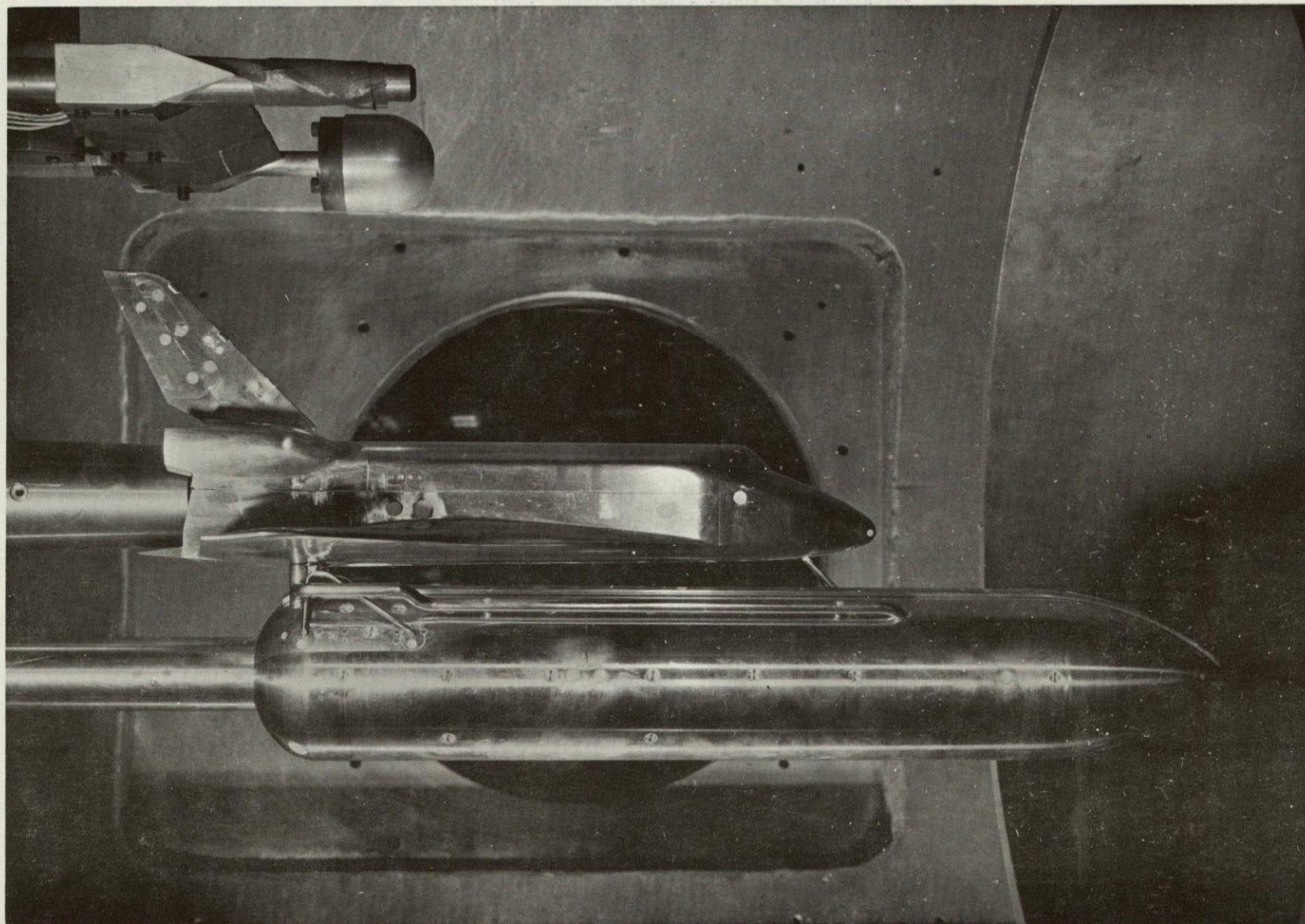
b. 37-0 Instrumentation Locations

Figure 2. - Concluded.



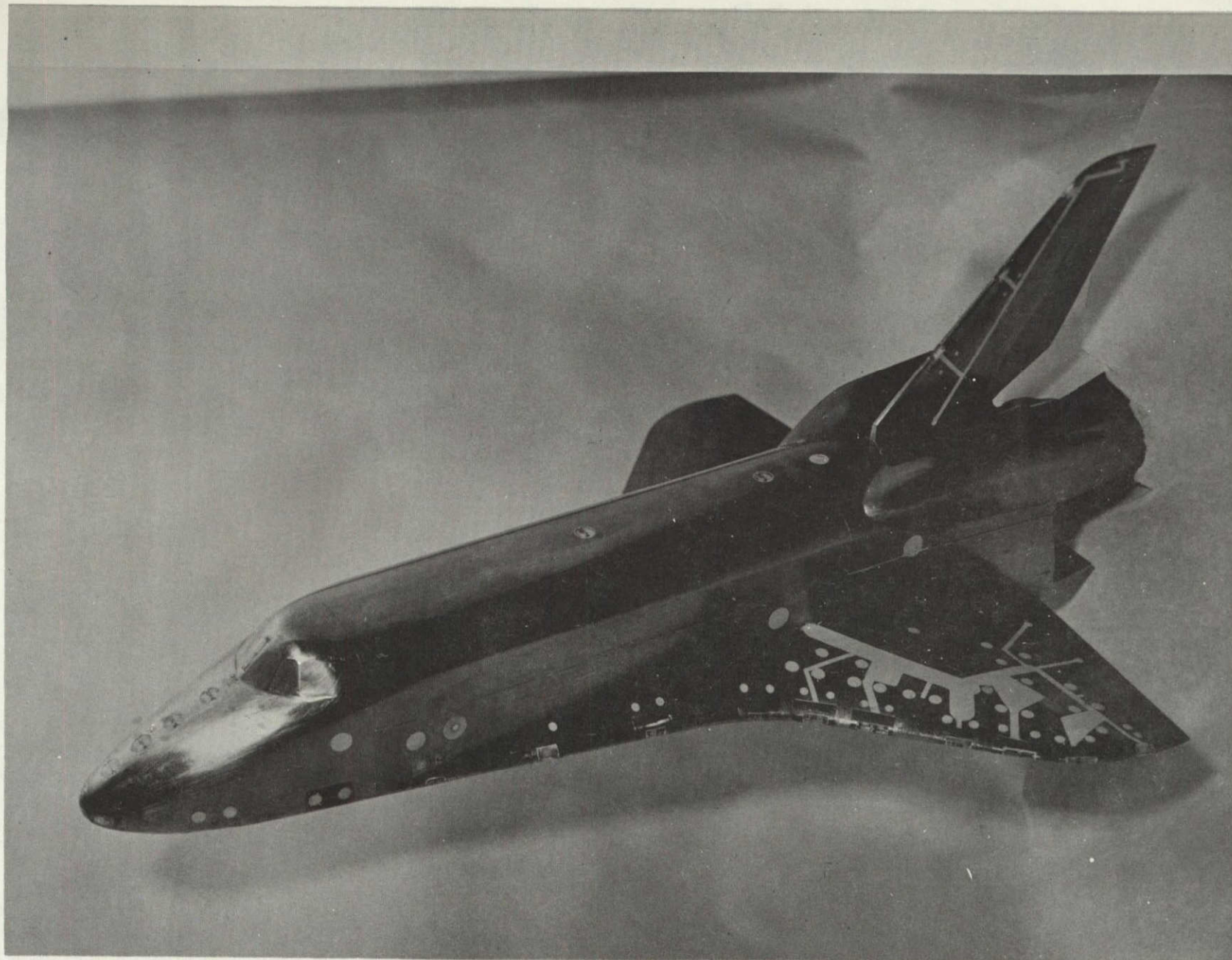
a. Installation of model 37-0 - Orbiter Alone

Figure 3.- Model photographs.



b. Installation of Model 37-OT - Orbiter/Tank

Figure 3. - Continued.



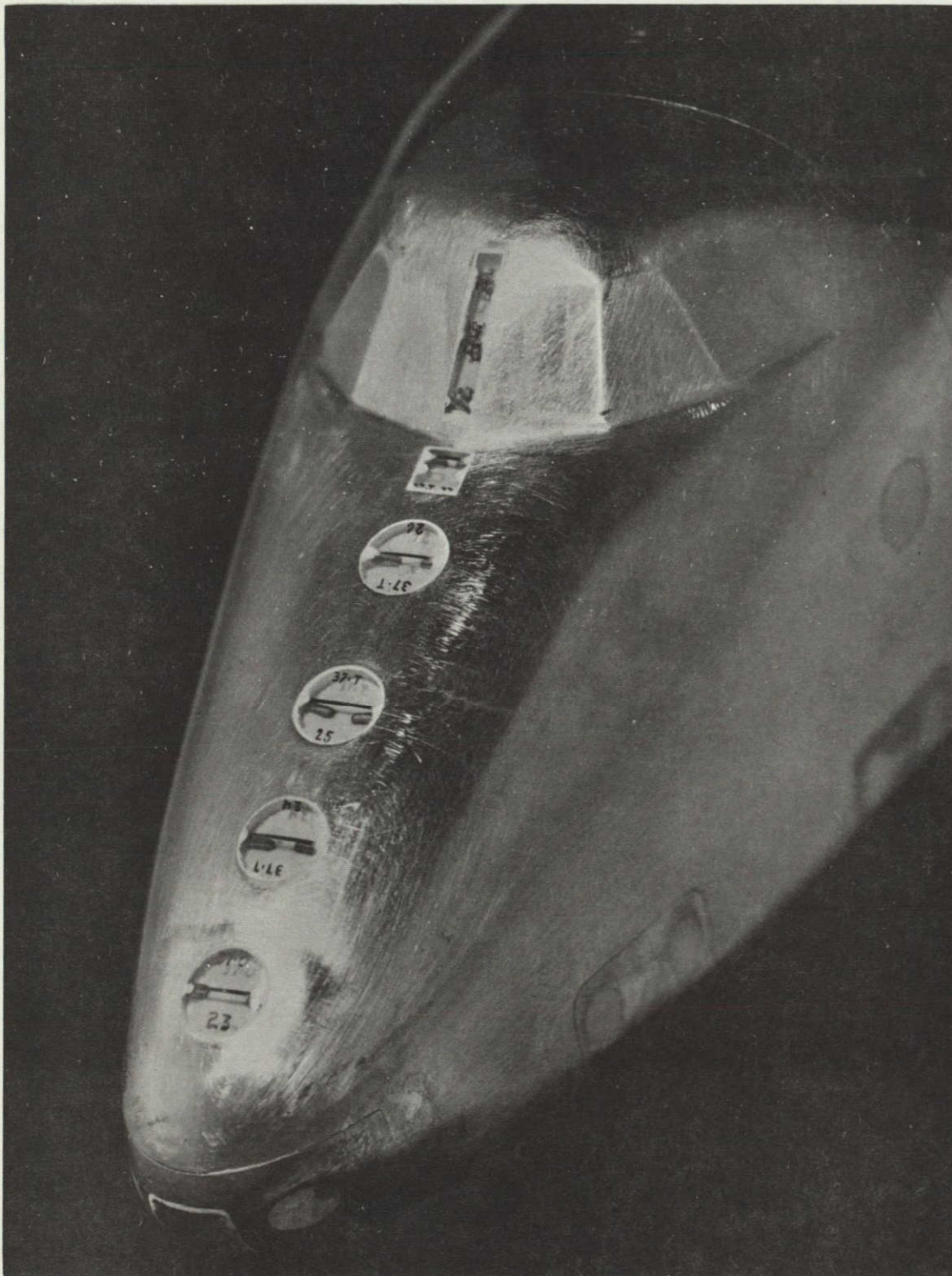
c. Instrumentation - Orbiter Top View

Figure 3. - Continued.



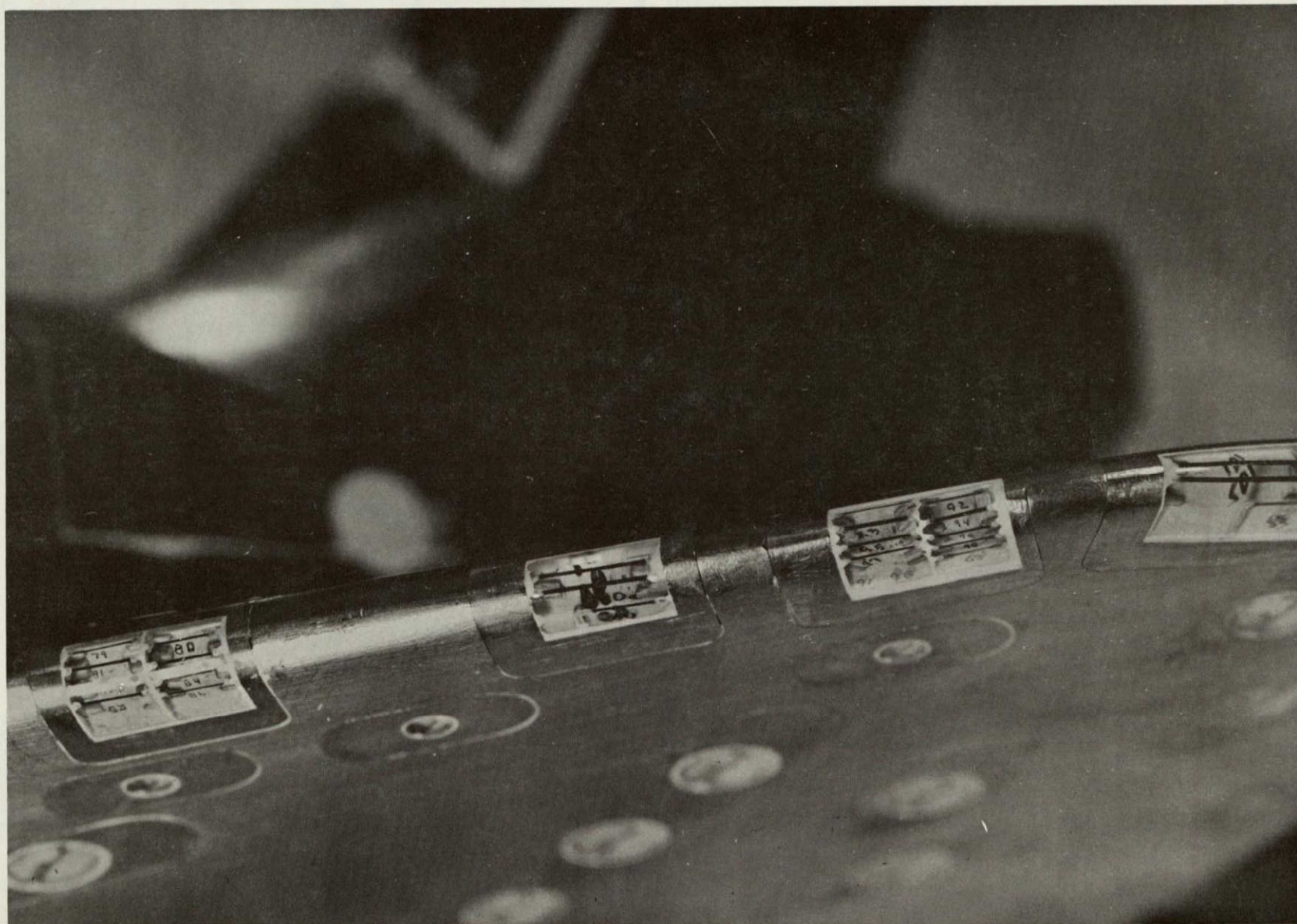
d. Instrumentation - Orbiter Bottom Surface

Figure 3. - Continued.



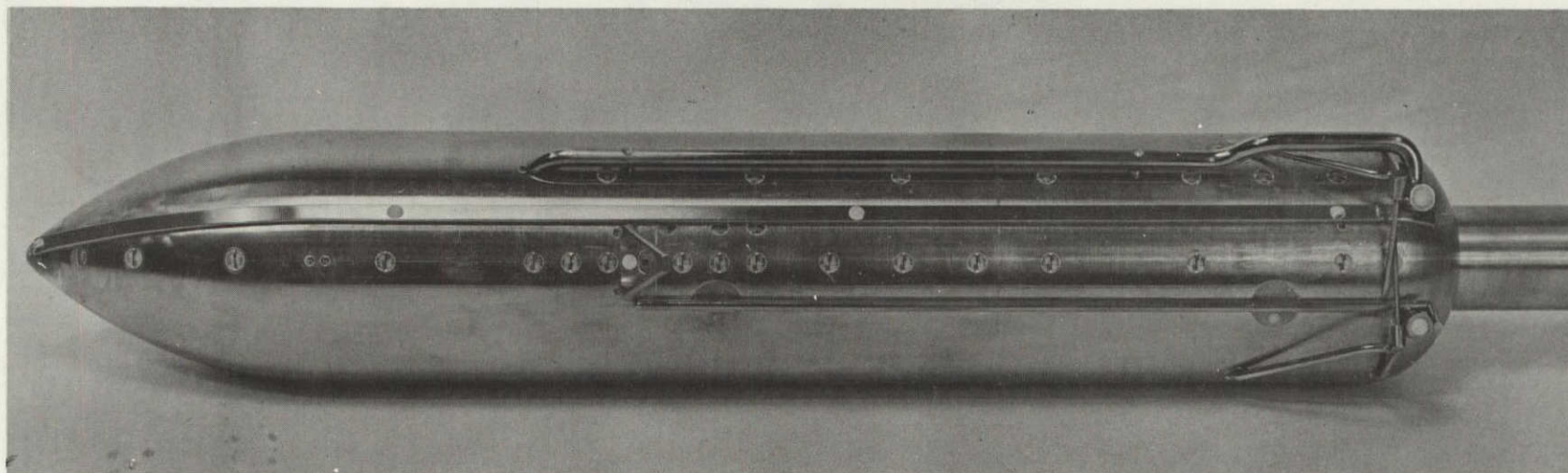
e. Instrumentation - Orbiter Nose and Canopy

Figure 3. - Continued.



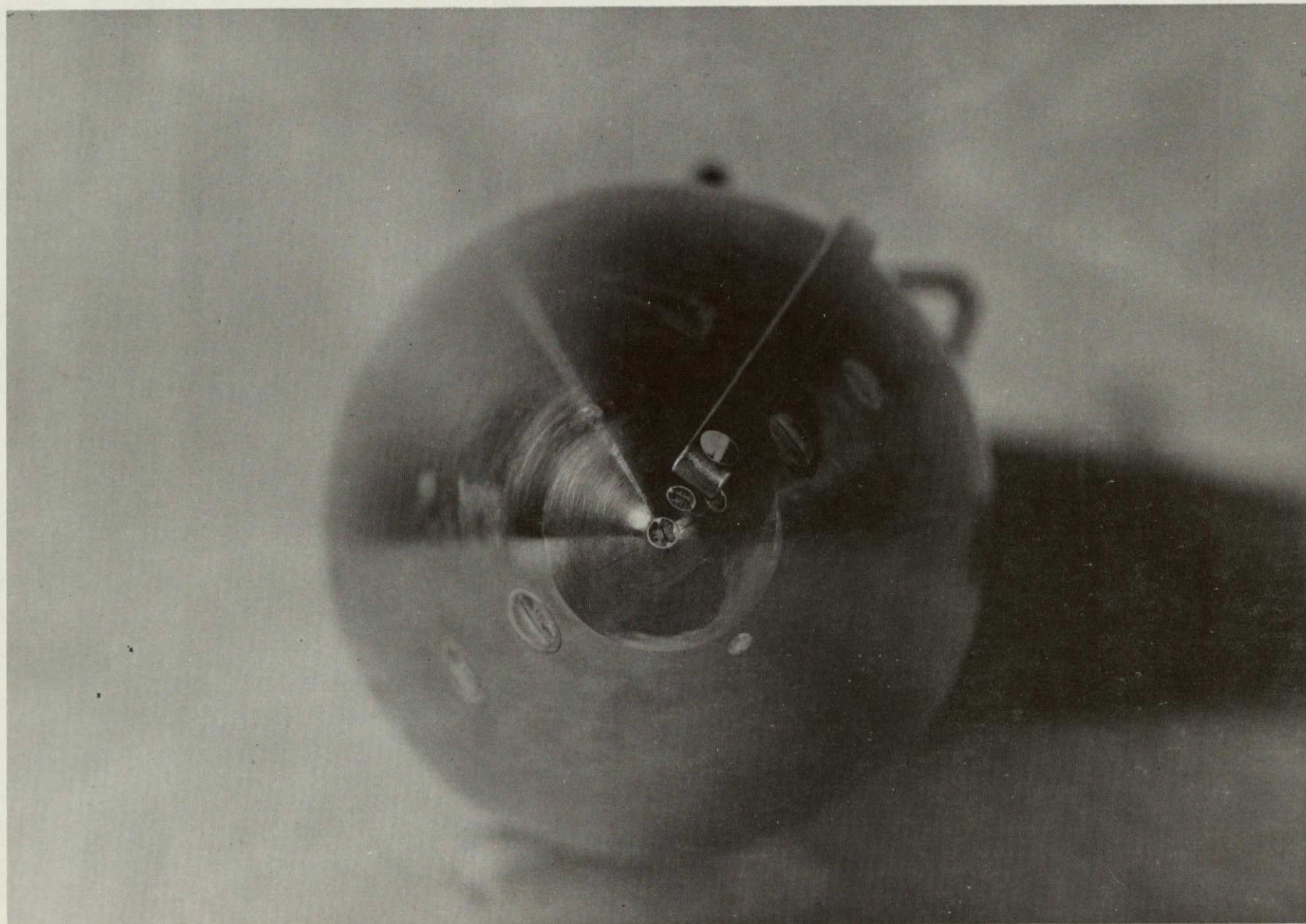
f. Instrumentation - Orbiter Wing Leading Edge

Figure 3. - Continued.



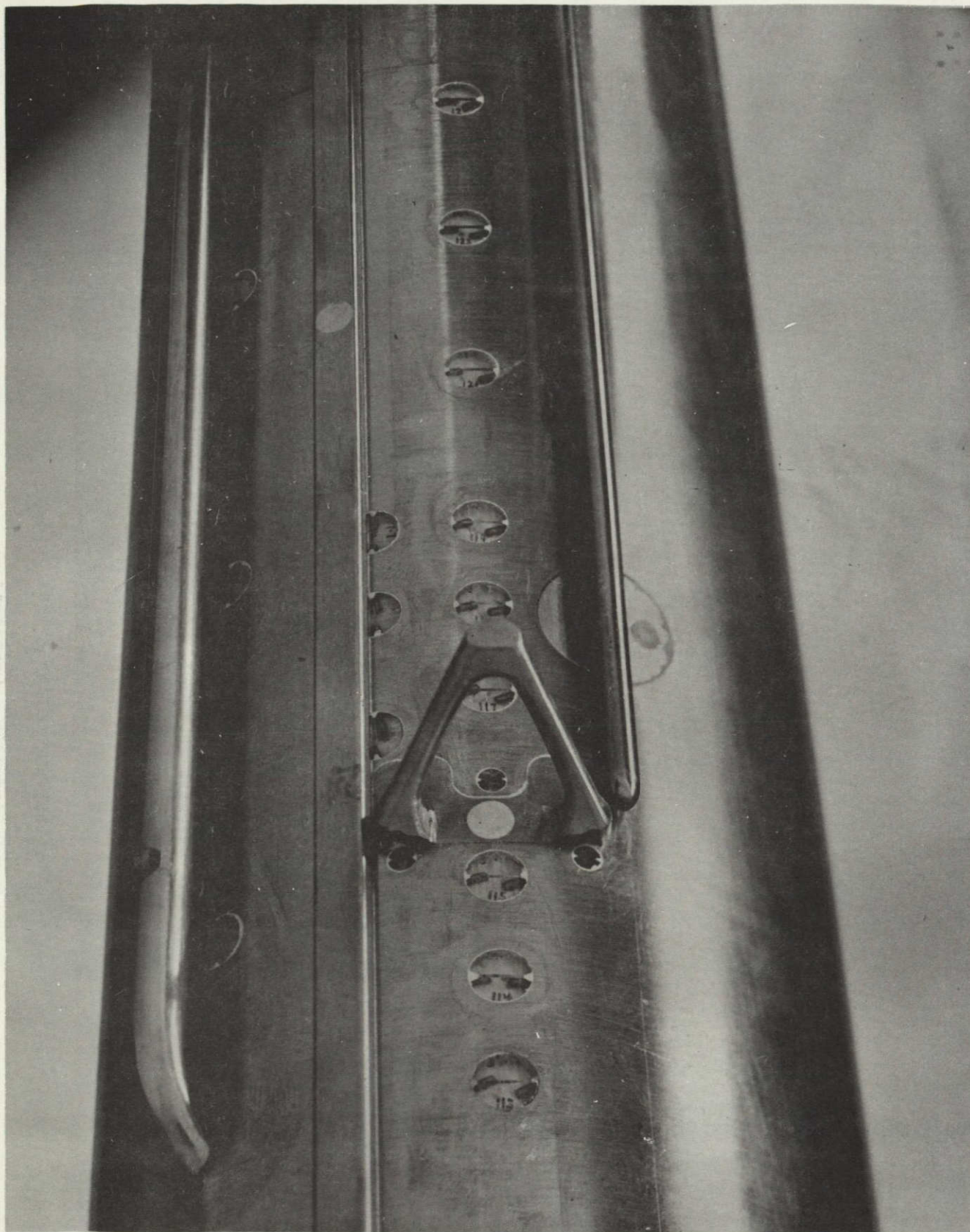
g. Instrumentation - Tank Top View

Figure 3. - Continued.

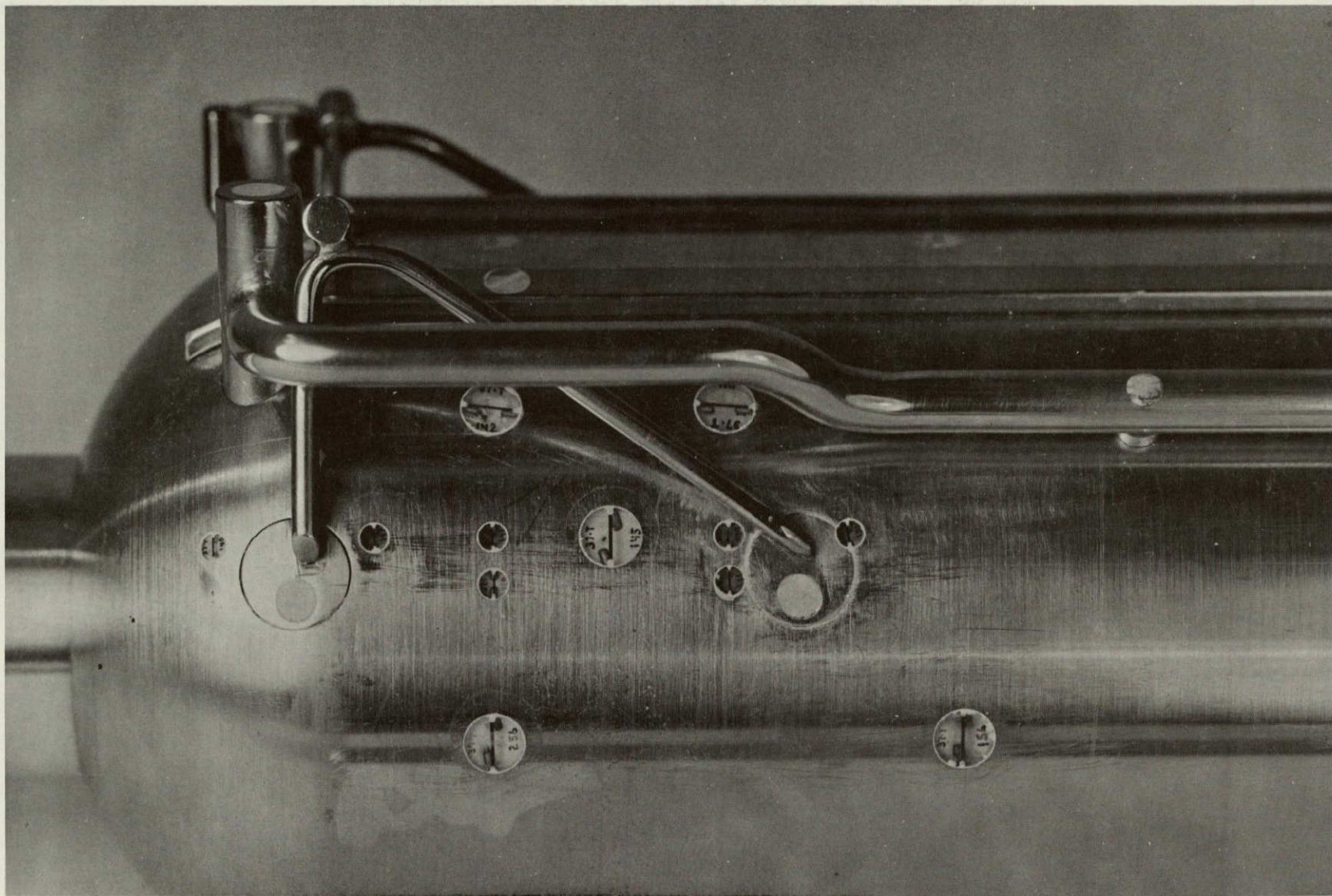


h. Instrumentation - Tank Nose

Figure 3. - Continued.

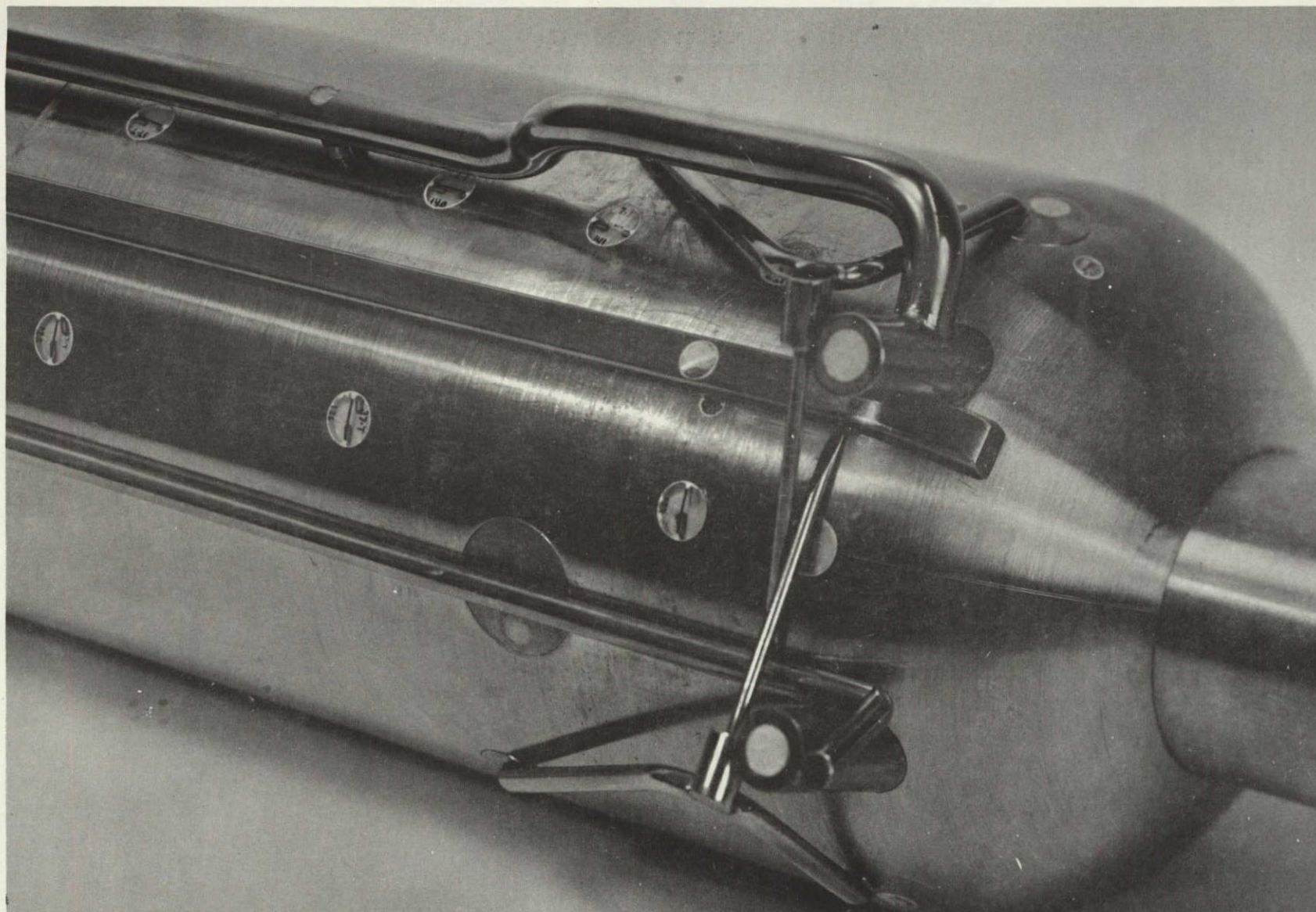


i. Instrumentation - Tank Forward Attachment Strut
Figure 3. - Continued.



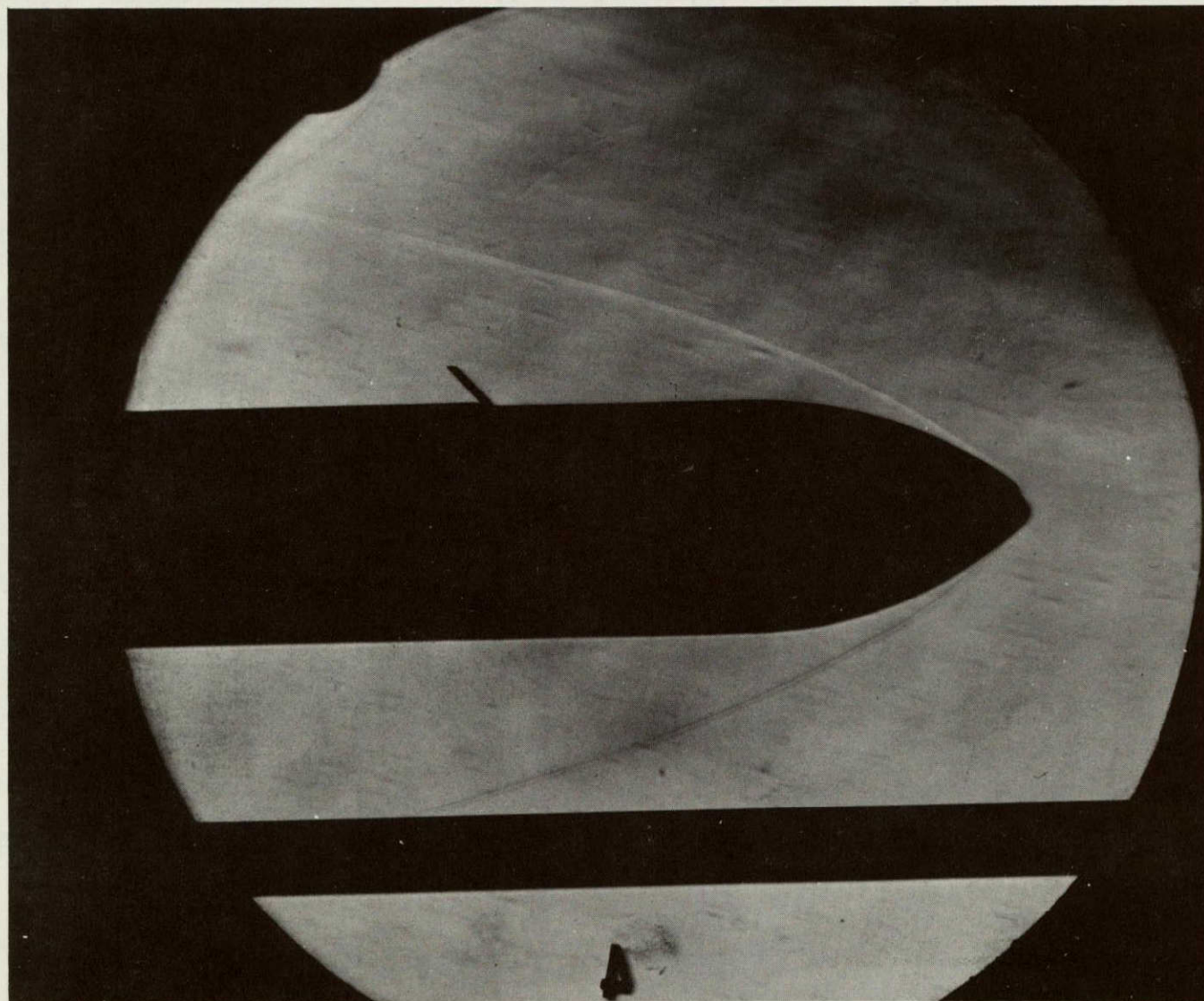
j. Instrumentation - Tank Aft Attachment Struts - Side View

Figure 3. - Continued.



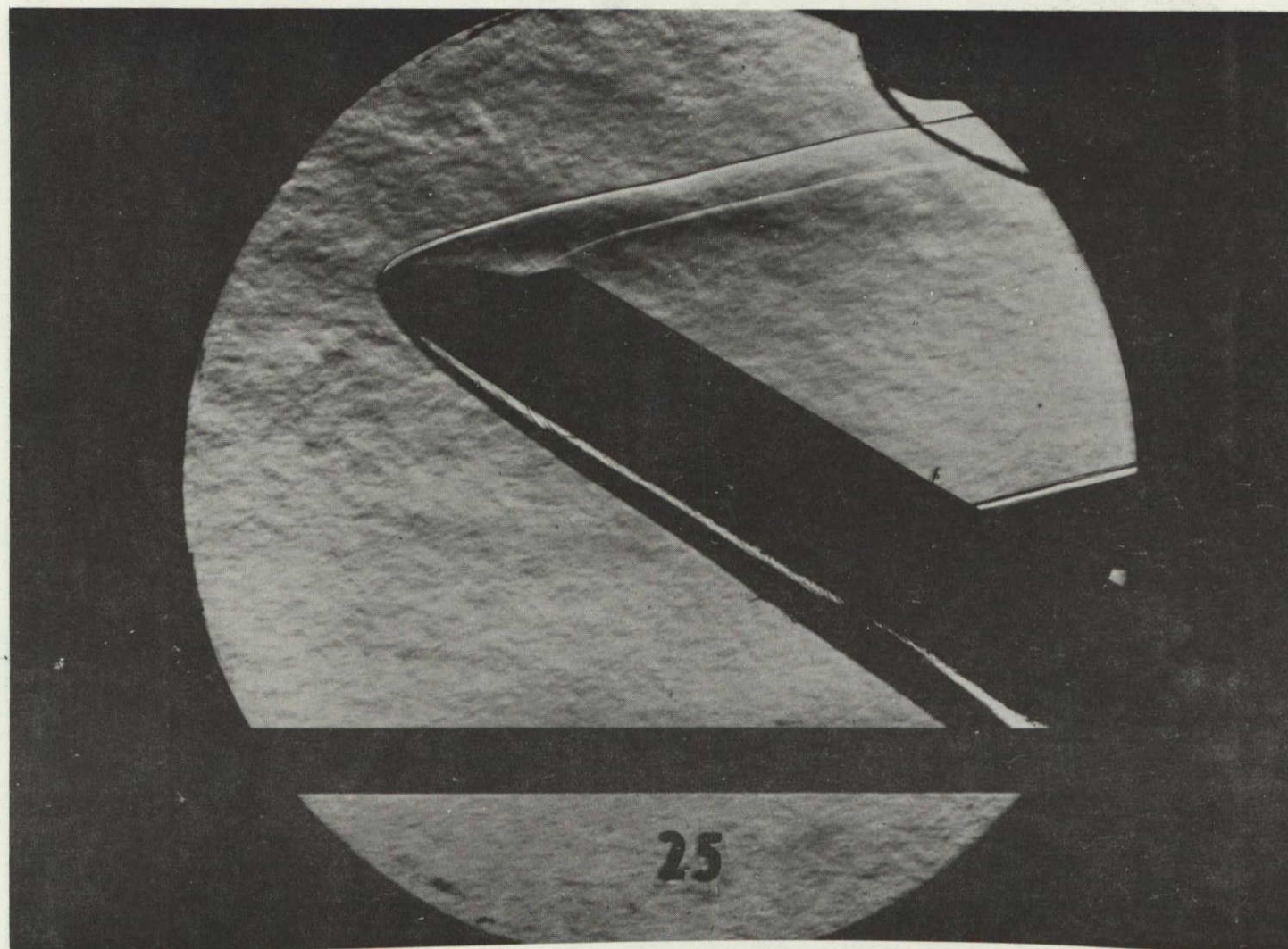
k. Instrumentation - Tank Aft Attachment Struts - Top View

Figure 3. - Continued.



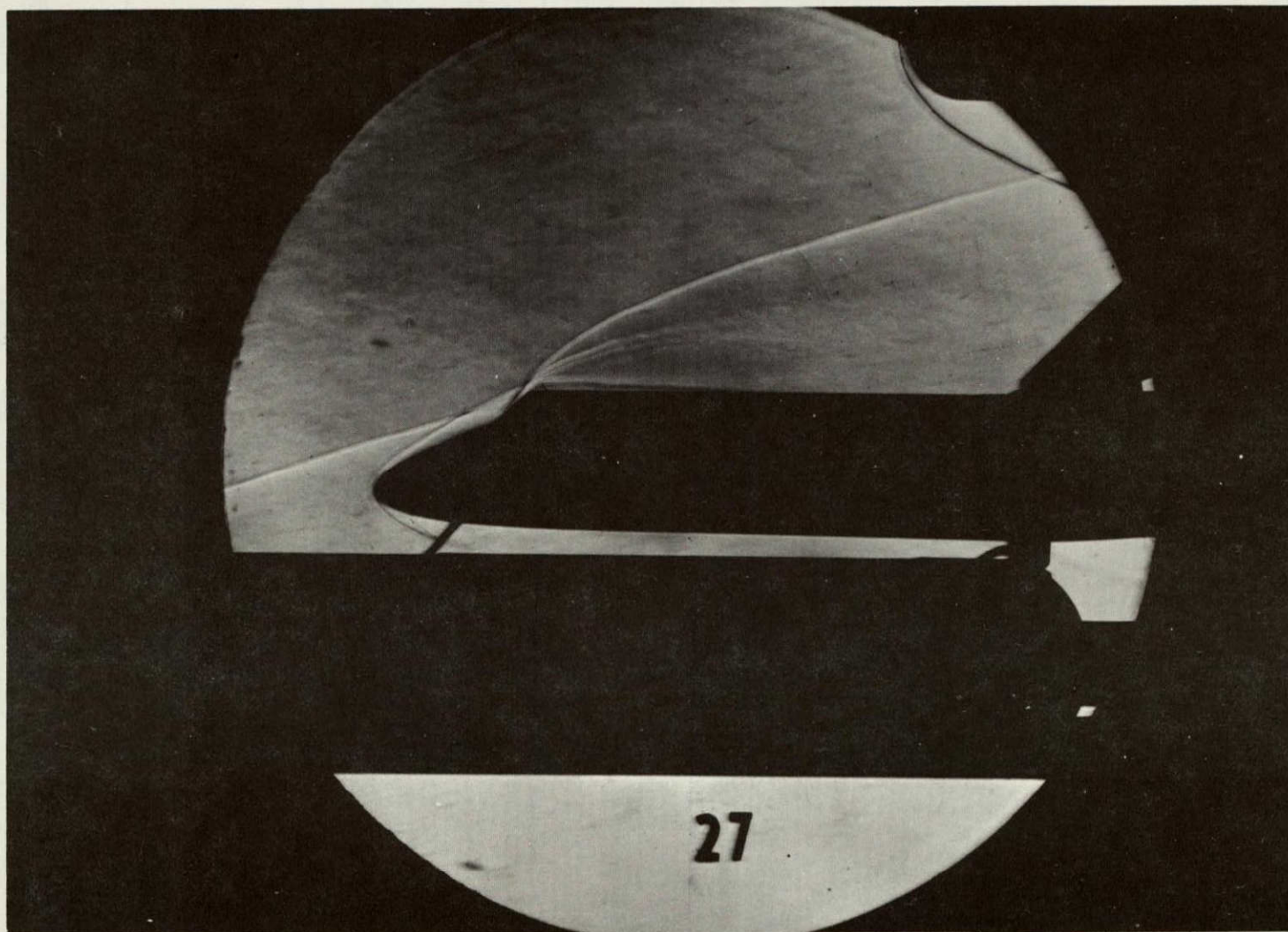
1. Sample Schlieren, Tank Alone, Run 4, $\alpha = 0^\circ$, $M_\infty = 6.99$, $R_e/ft = 0.12 \times 10^6$

Figure 3. - Continued.



m. Sample Schlieren, Orbiter Alone, Run 25, $\alpha = 30^\circ$, $M_\infty = 7.92$, $R_e/ft = 7.55 \times 10^6$

Figure 3. - Continued.



n. Sample Schlieren, Orbiter/Tank, Run 27, $\alpha = 0^\circ$, $M_\infty = 7.61$, $R_e/ft = 1.20 \times 10^6$

Figure 3. - Concluded.

DATA FIGURES
VOLUME 1--Figures 4-17

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OH12/1H21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	.000	6.997	.000		
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

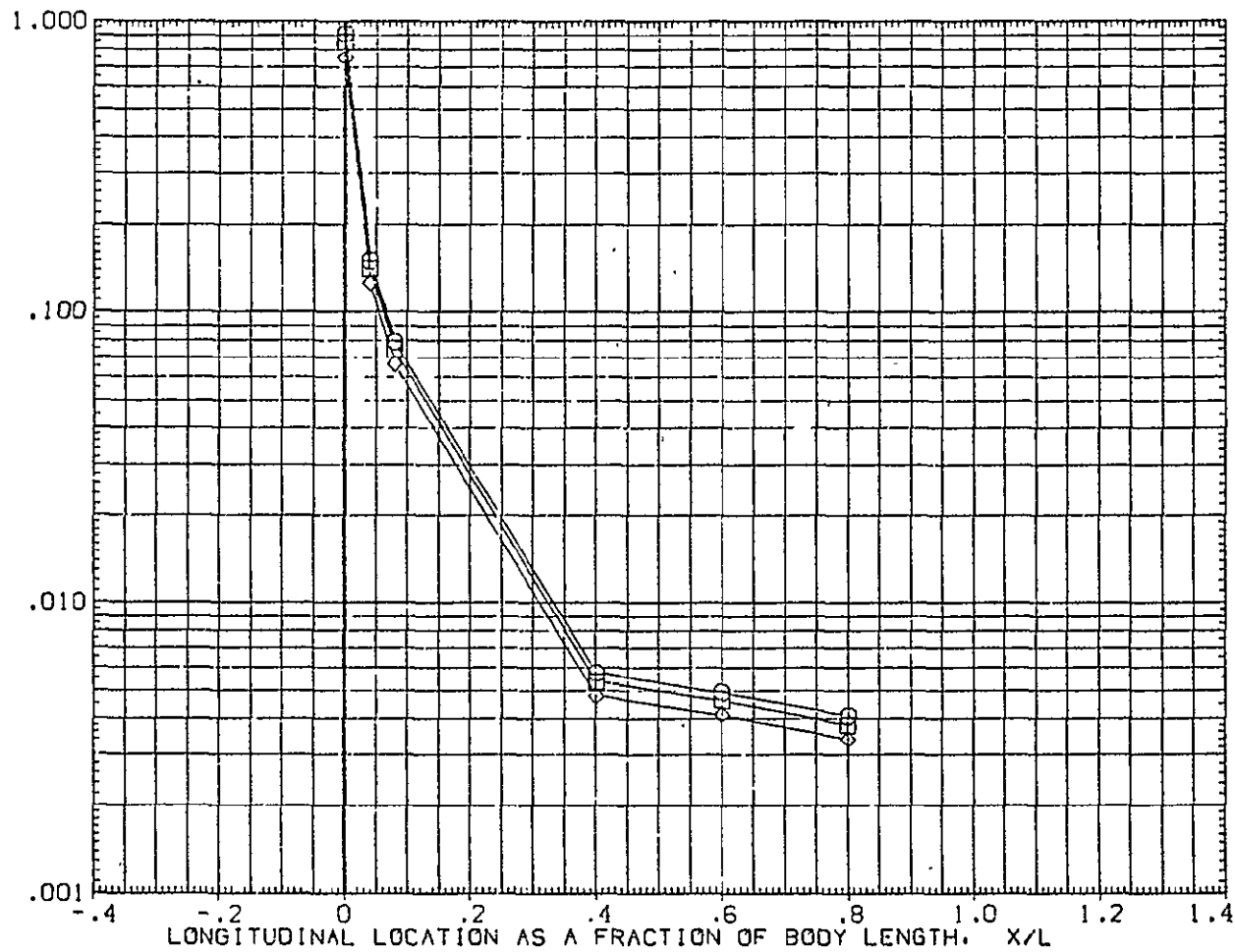


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

0412/1H21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	MAW/HT	PHI	MACH	PARAMETRIC VALUES		
□	.830	183.030	6.993	ALPHA	.000	BETA
◇	1.000					.000

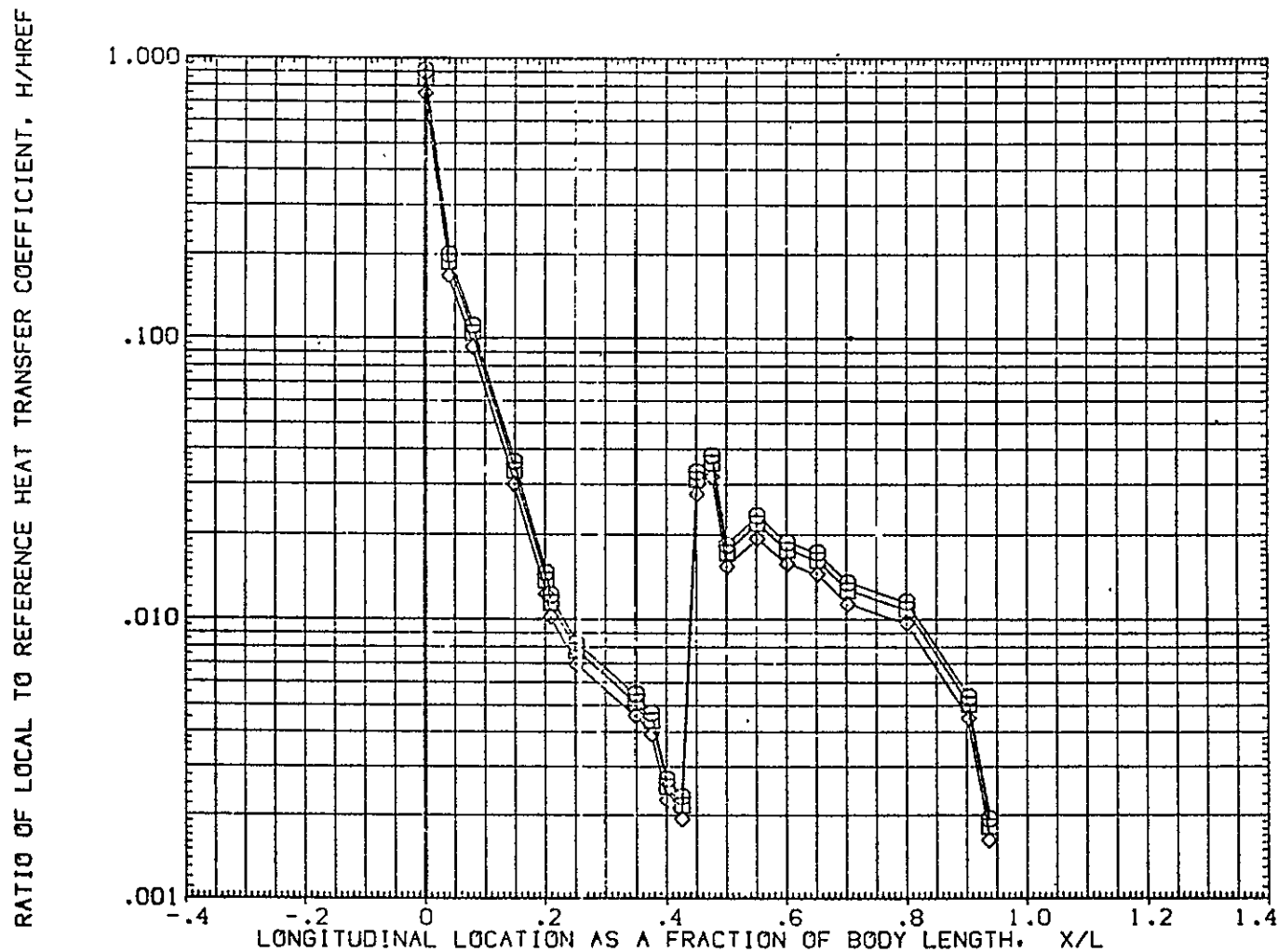
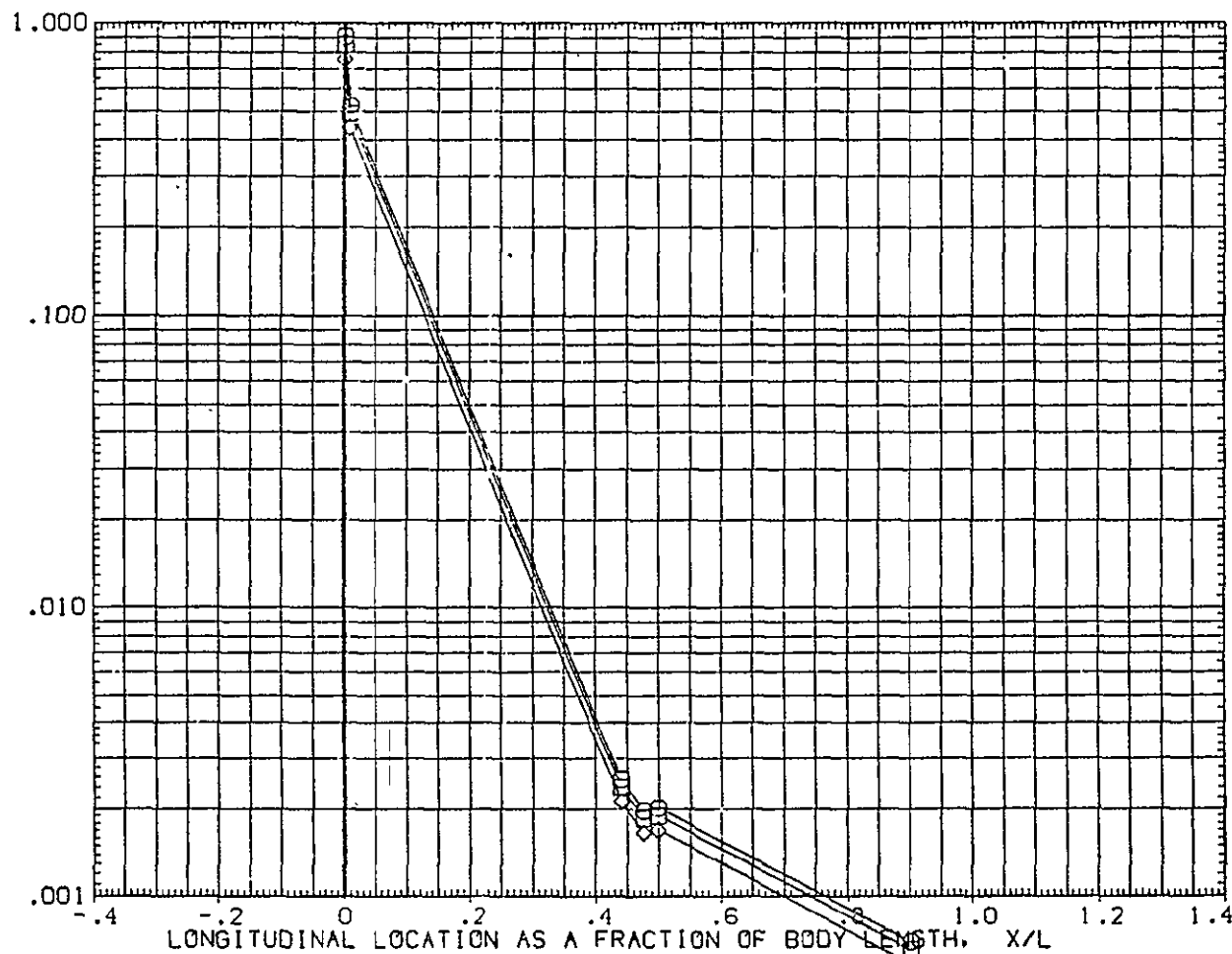


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/1H21 (CAL HST 173-100) 37 T

TANK

(SUGT01)

SYMBOL
○
□
◇HAW/HT
.850
.900
1.000PHI
199.000MACH
6.293PARAMETRIC VALUES
ALPHA .000 BETA .000RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF} FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/L ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	221.000	6.993	.000	.000	.000
□	.900					
◇	1.000					

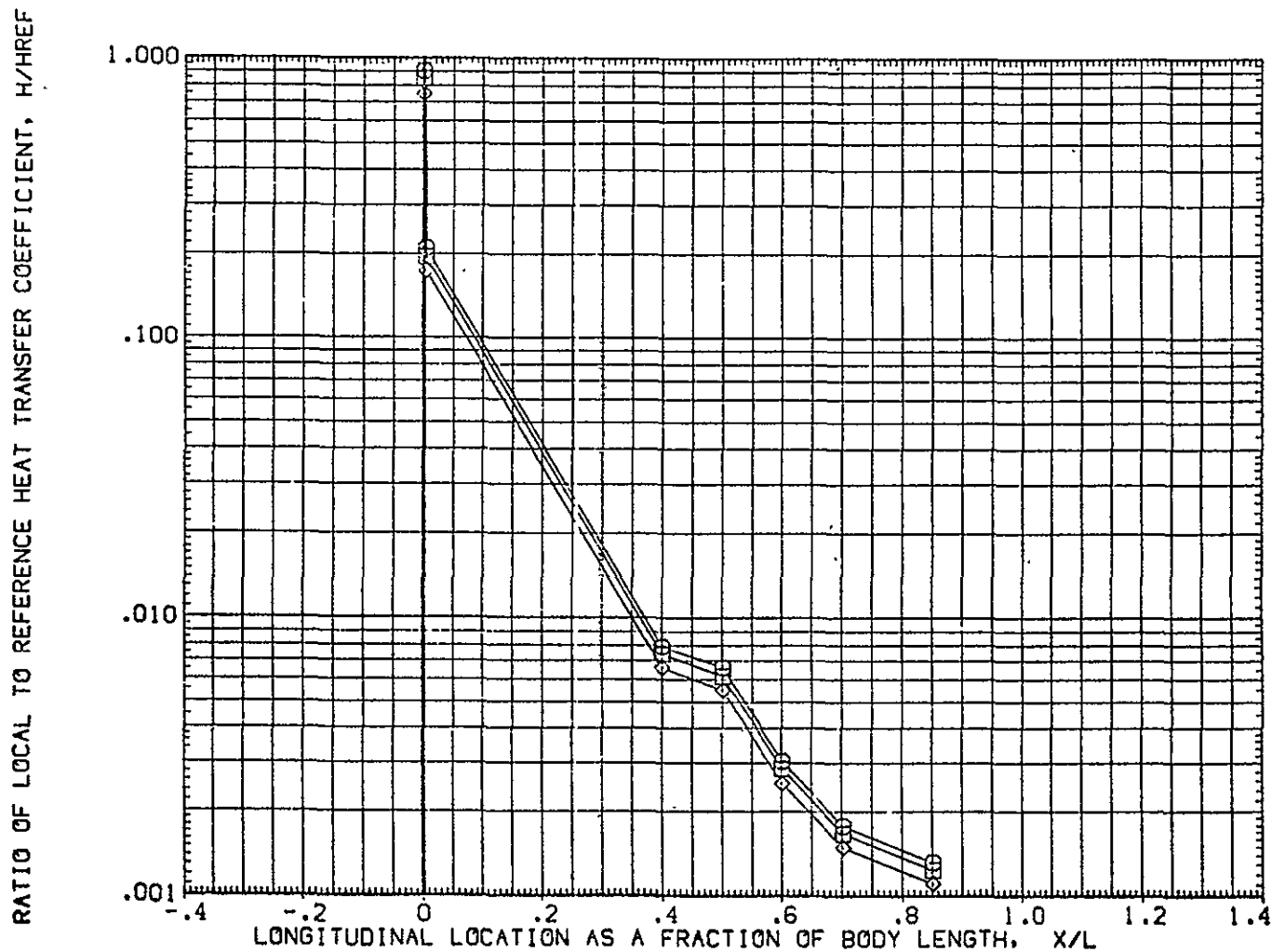


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

CH12/IH21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	241.000	6.993	.000		.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

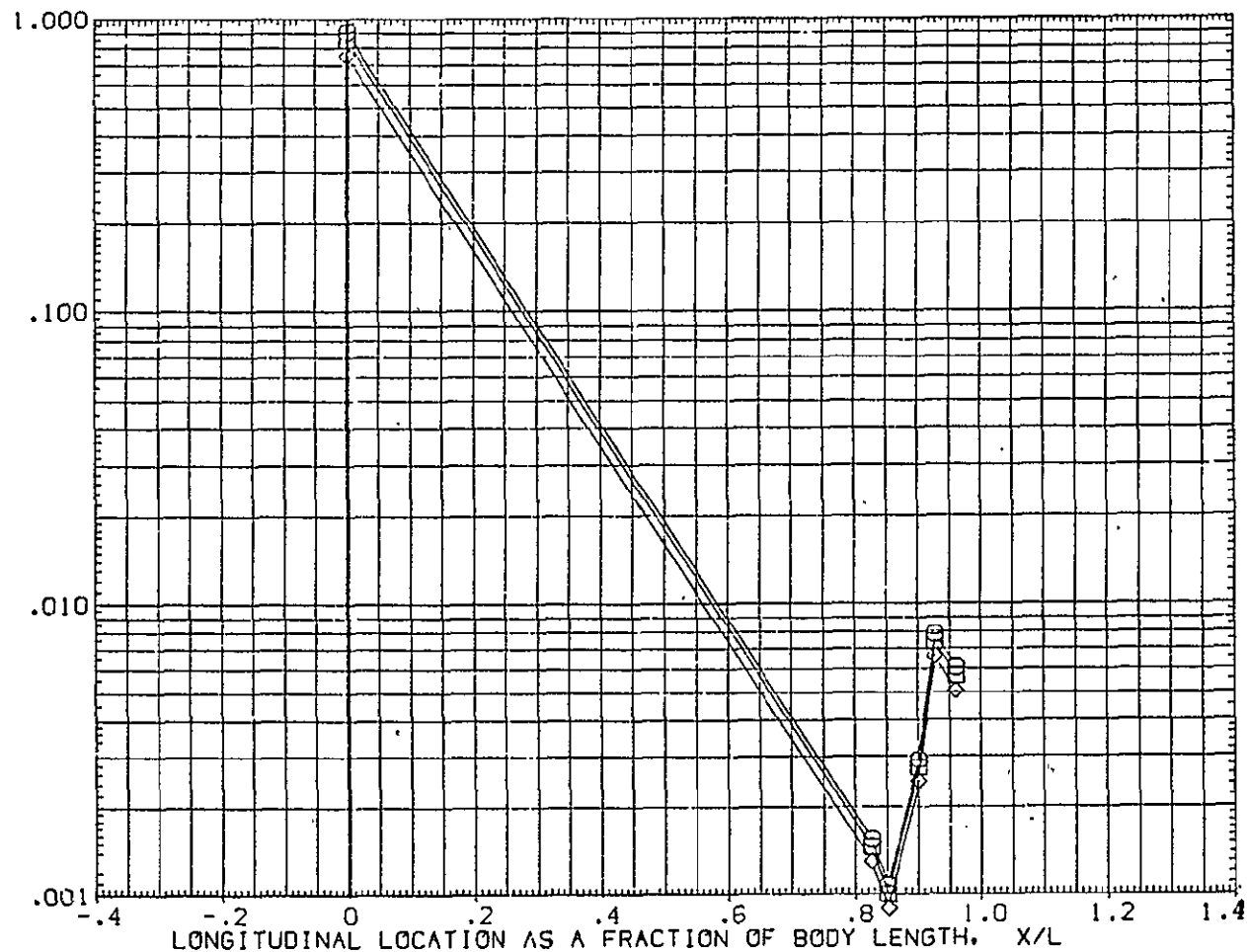


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	247.000	6.993	.000		.000
□	.900					
□	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

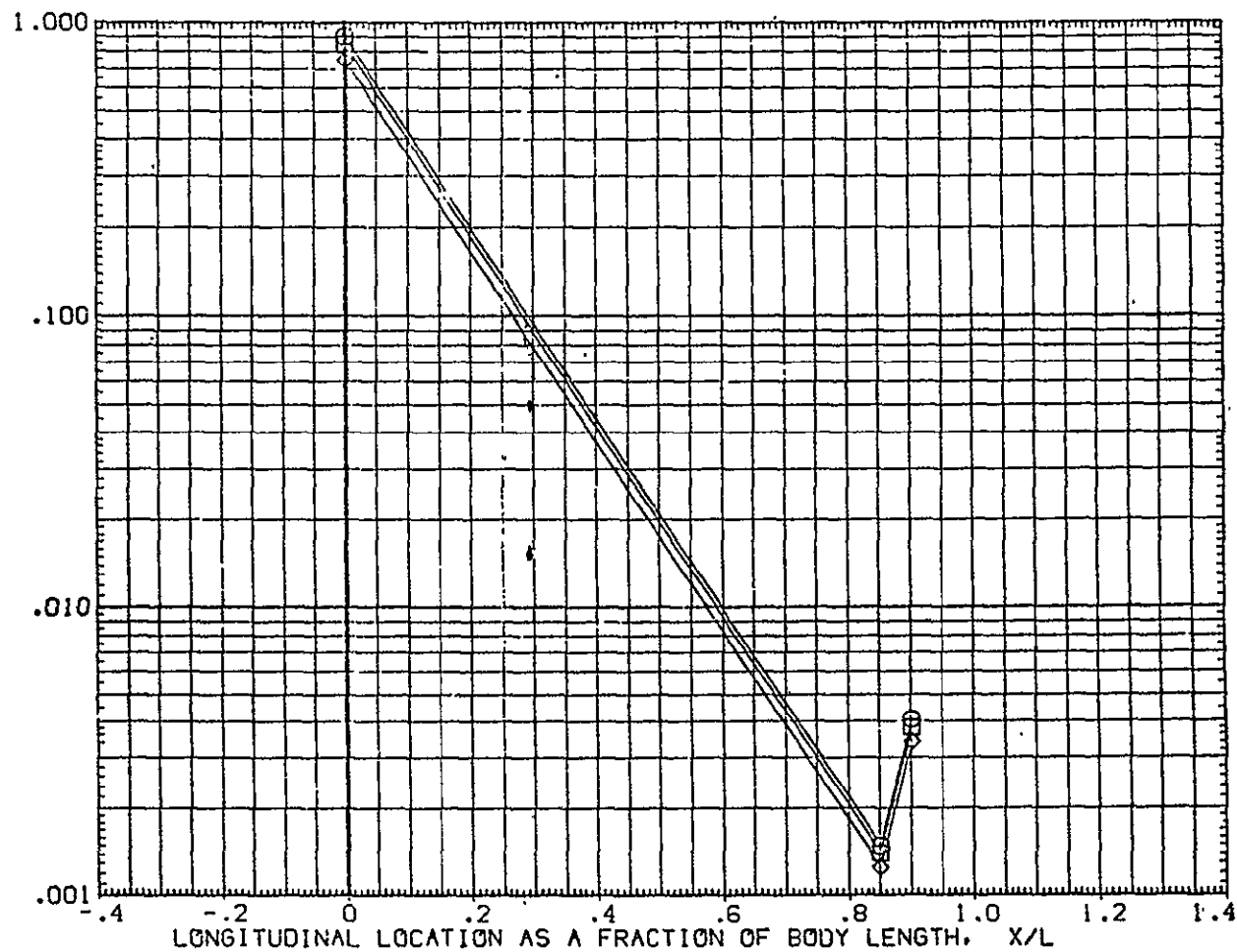


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	270.000	6.993	.000	.000	.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

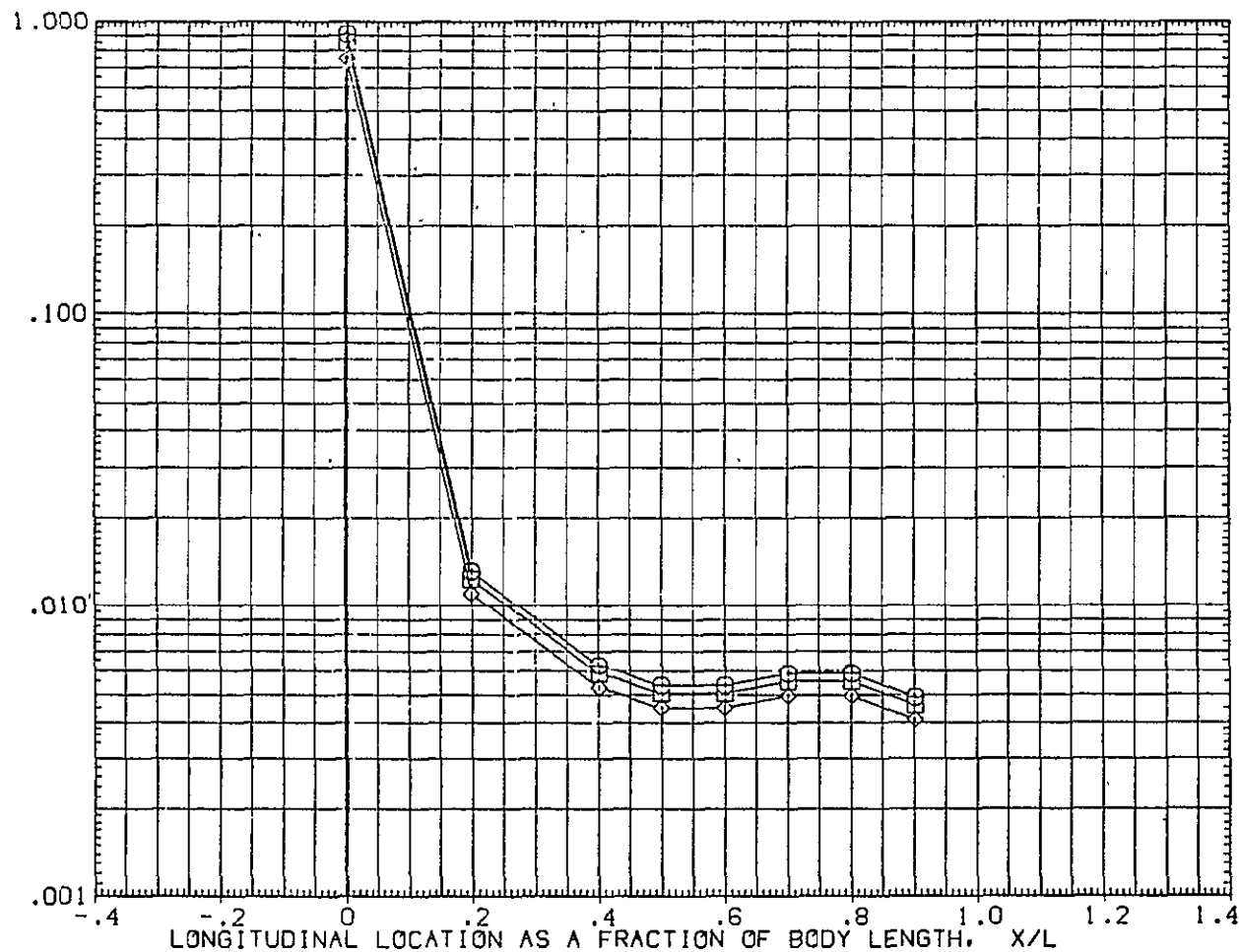


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

OH12/1H21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	315.000	6.993	.000		.000
□	.900					
○	1.000					

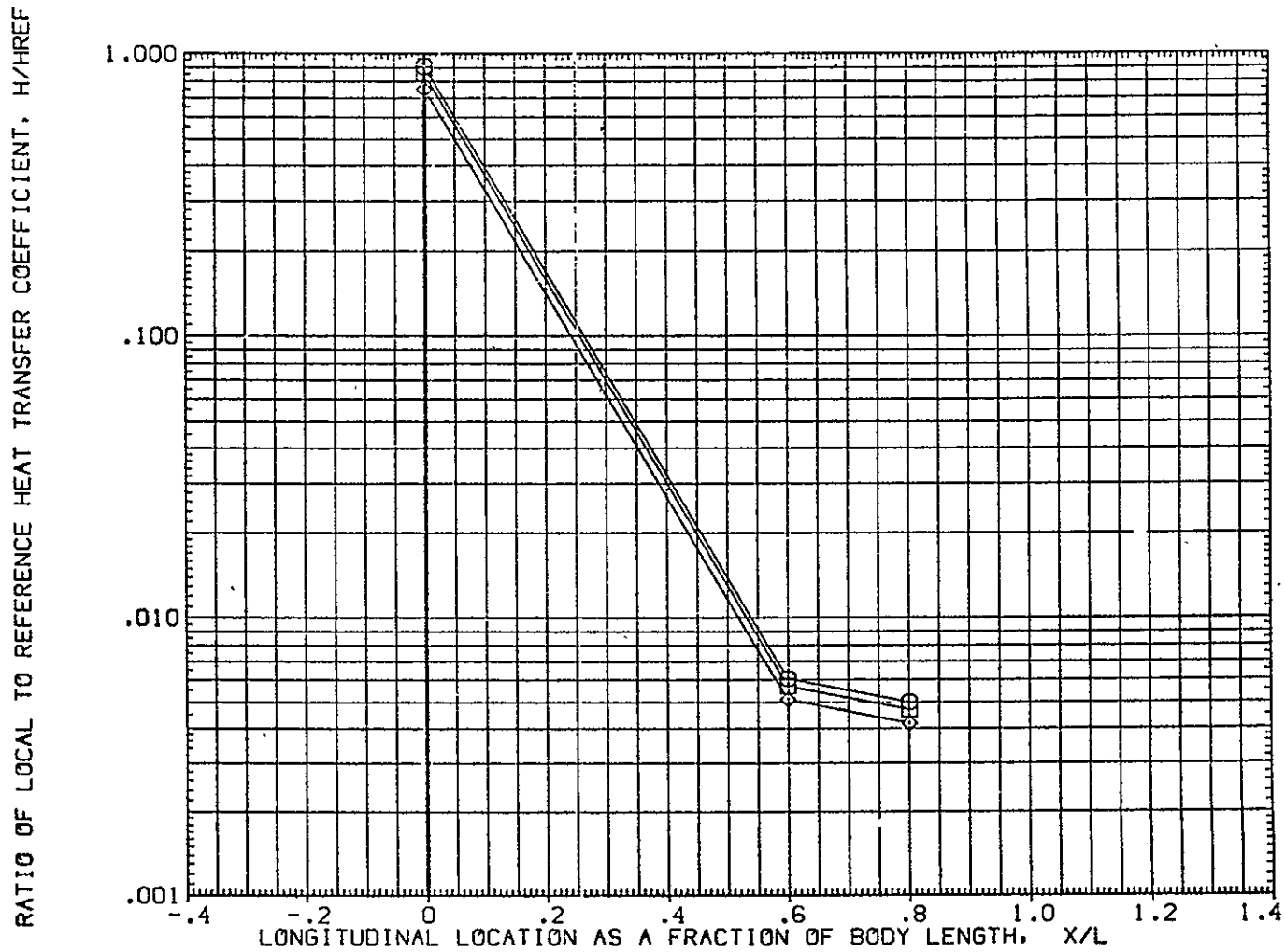


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/[H2] (CAL HST 173-100) 37 T TANK (SUGTOI)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.850	.000	7.618		BETA	.000
□	.900					
◇	1.000					

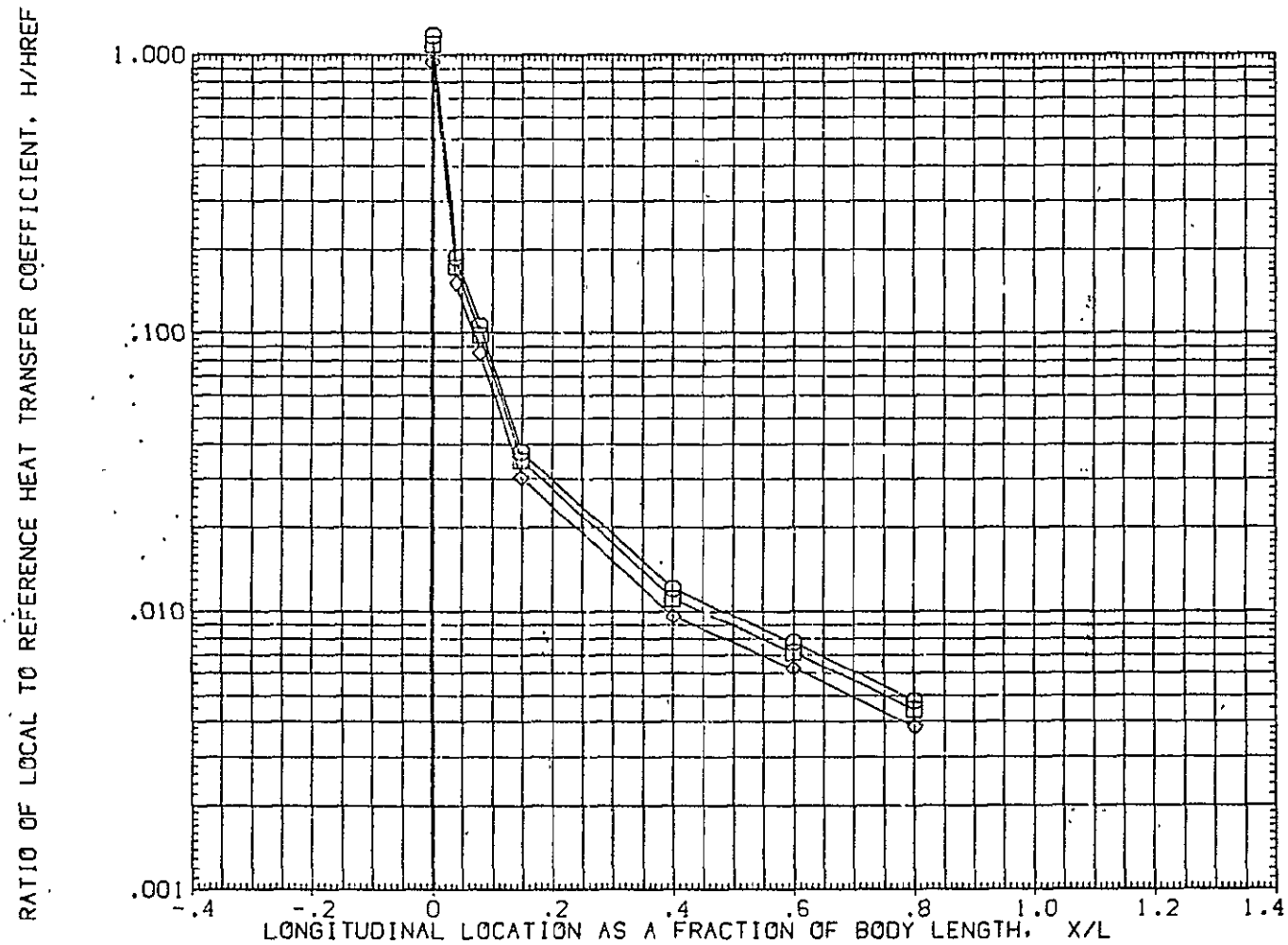


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	180.000	7.618	.000		.000
□	.900					
◇	1.000					

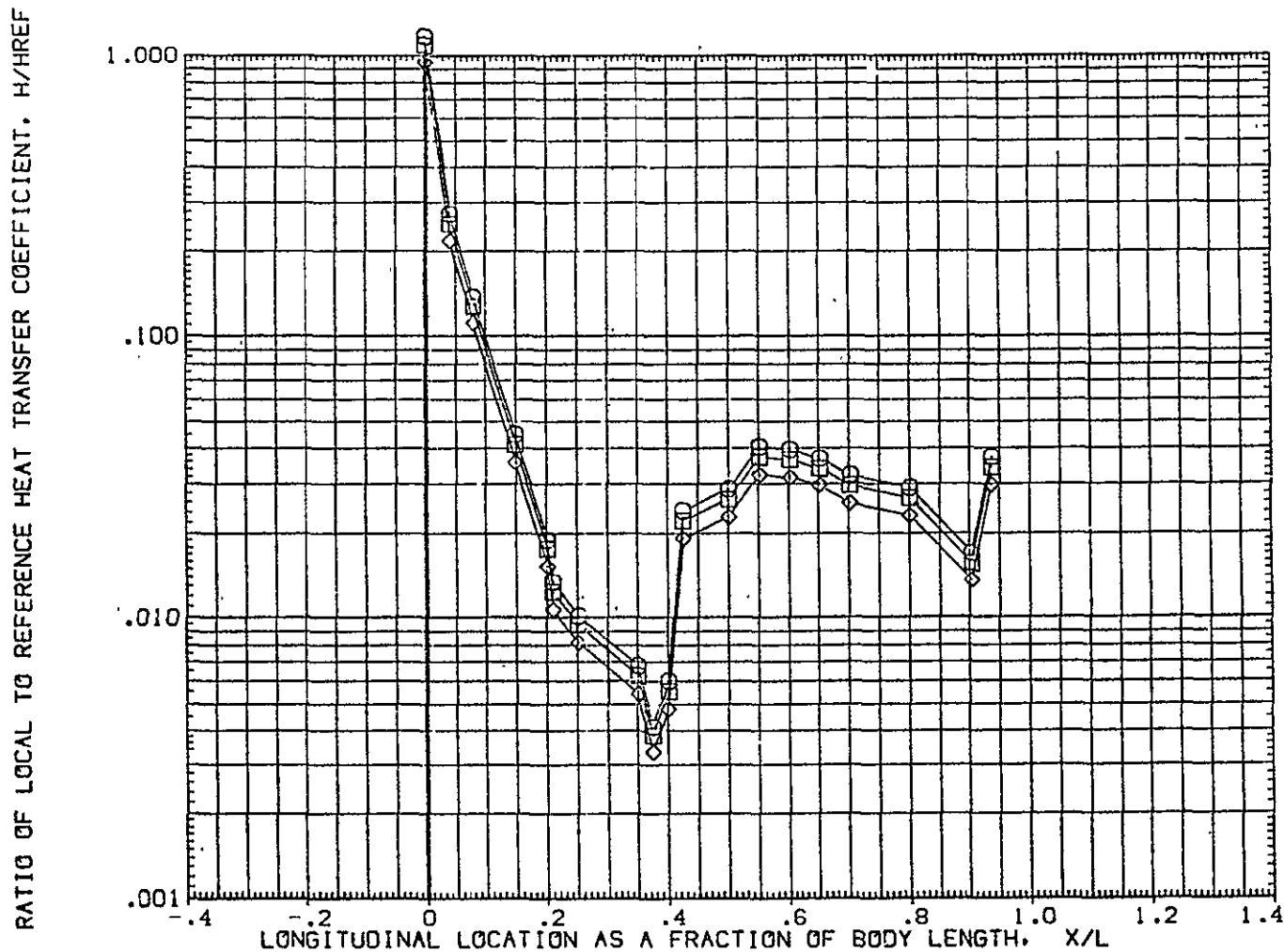


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/1H21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	199.000	7.618	.000		.000
□	.900					
◇	1.000					

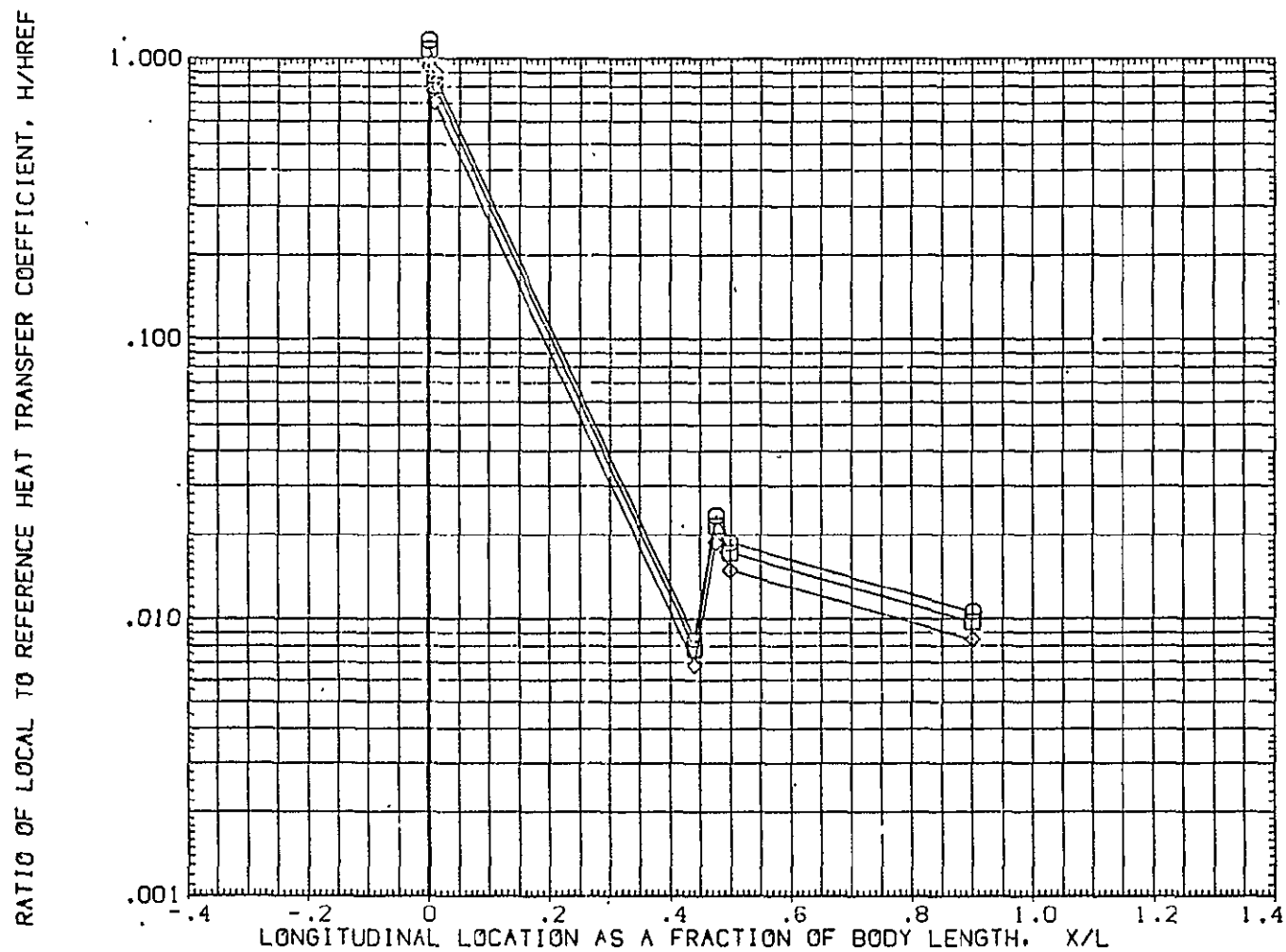


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAY/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	221.000	7.618	.000	.000	.000
□	.900					
○	1.000					

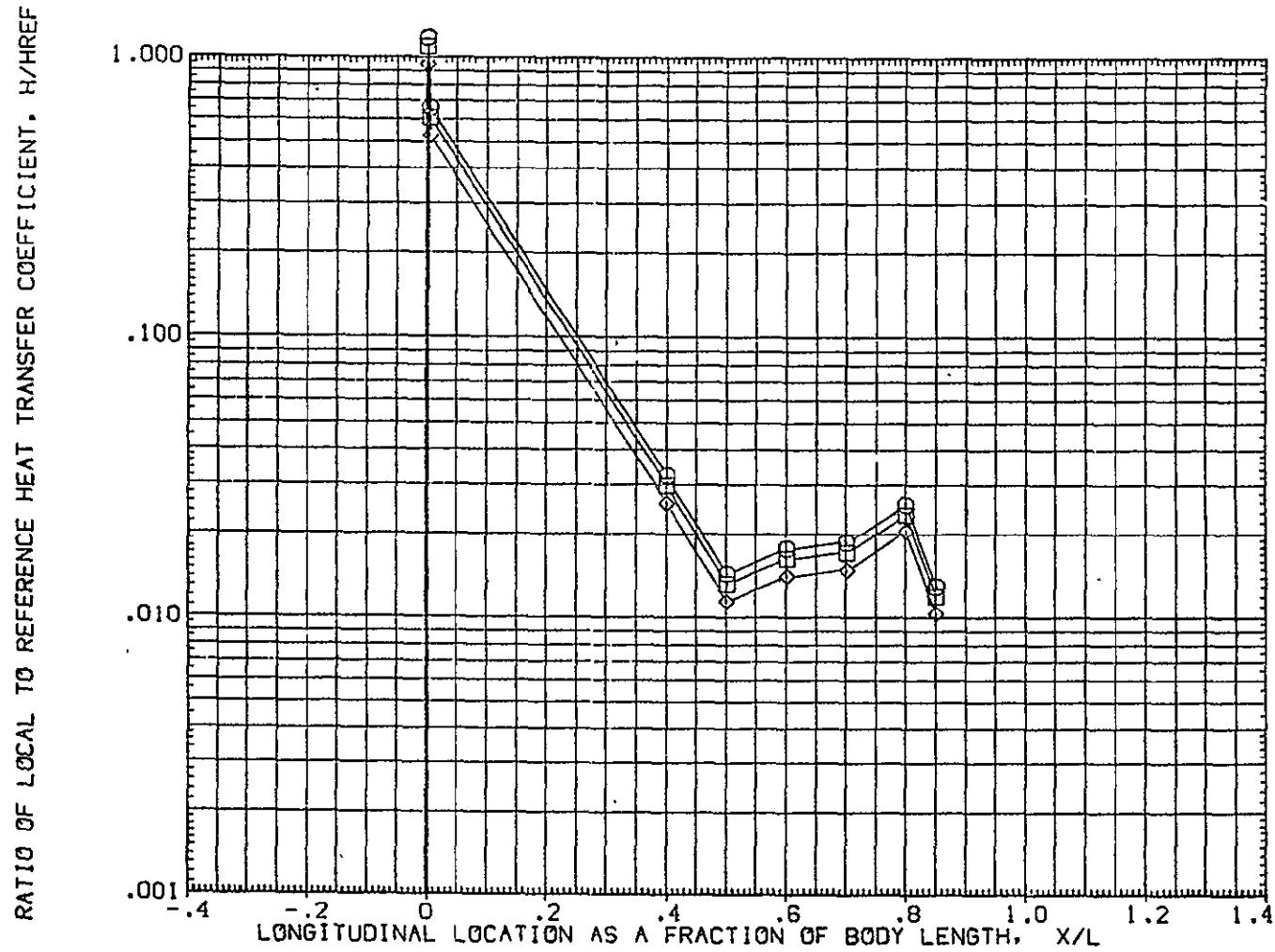


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

0H12/IH21 (CAL HST 173-100) 37 T TANK (SUGTO1)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	241.000	7.618	.000		.000
□	.900					
◇	1.000					

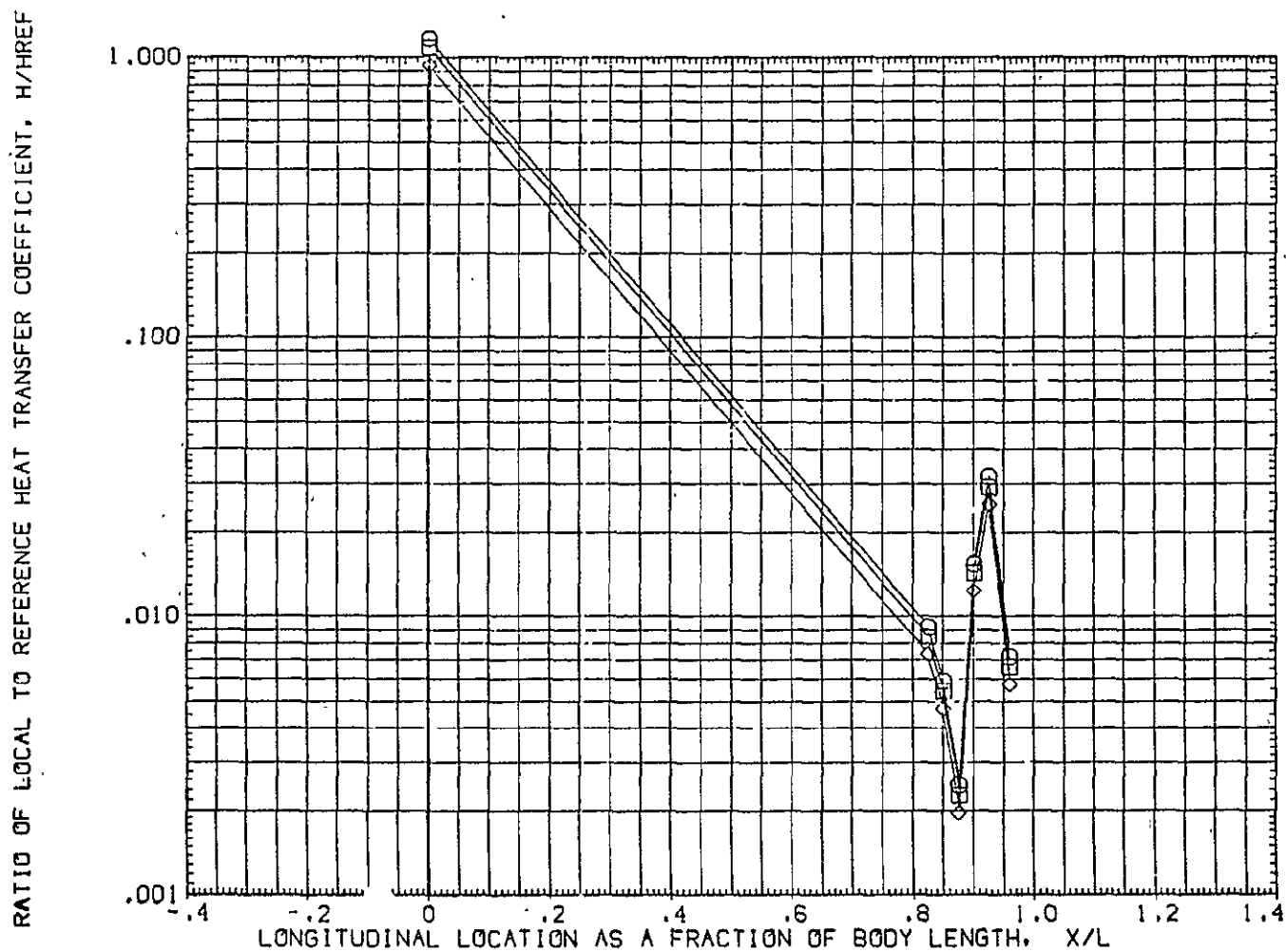


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	247.000	7.618	ALPHA	.000	BETA
□	.900					
◇	1.000					.000

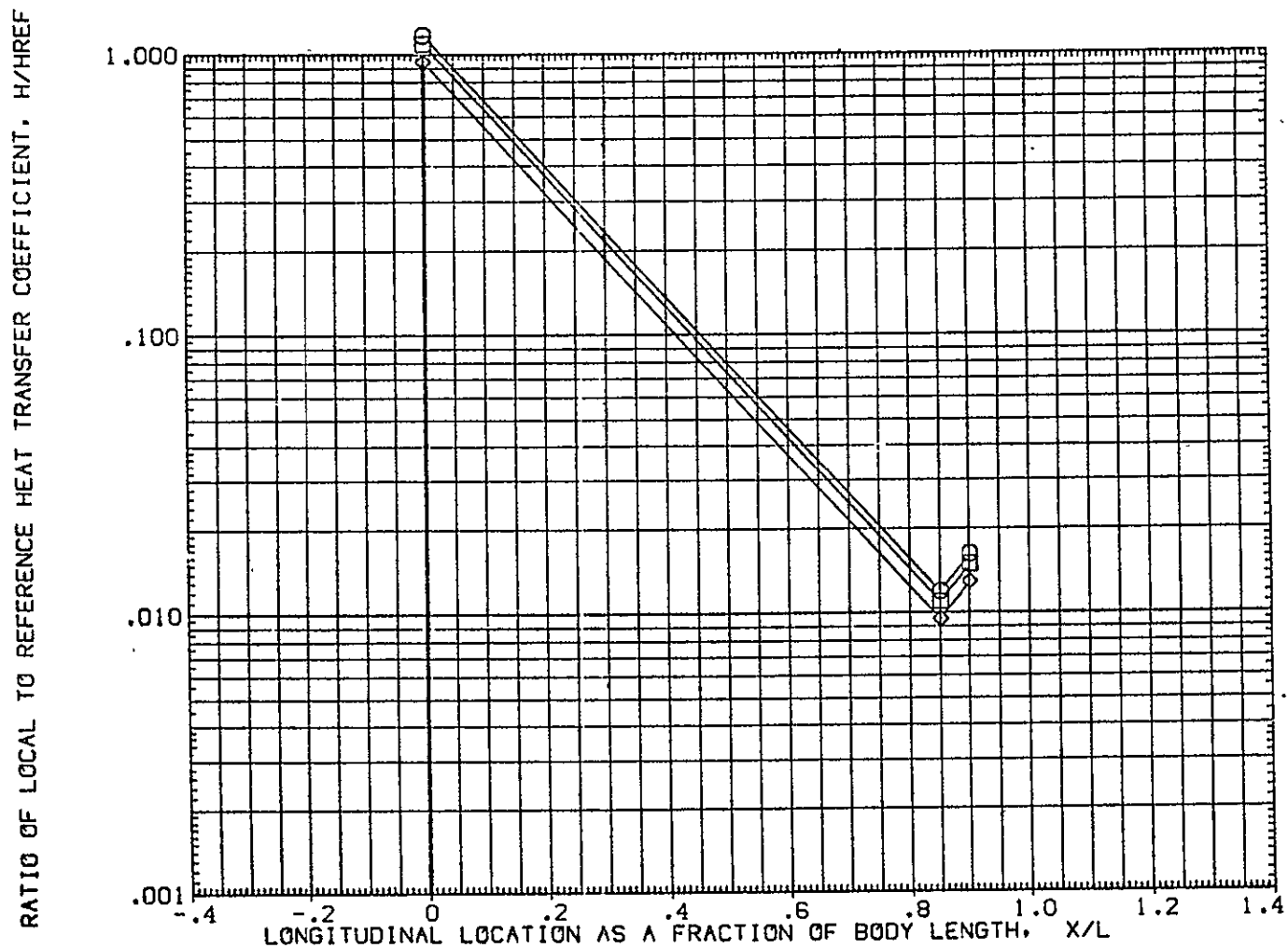


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/L ALPHA = 0

OH12/1H21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.850	270.000	7.618	.000	BE1A	.000
□	.900					
◇	1.000					

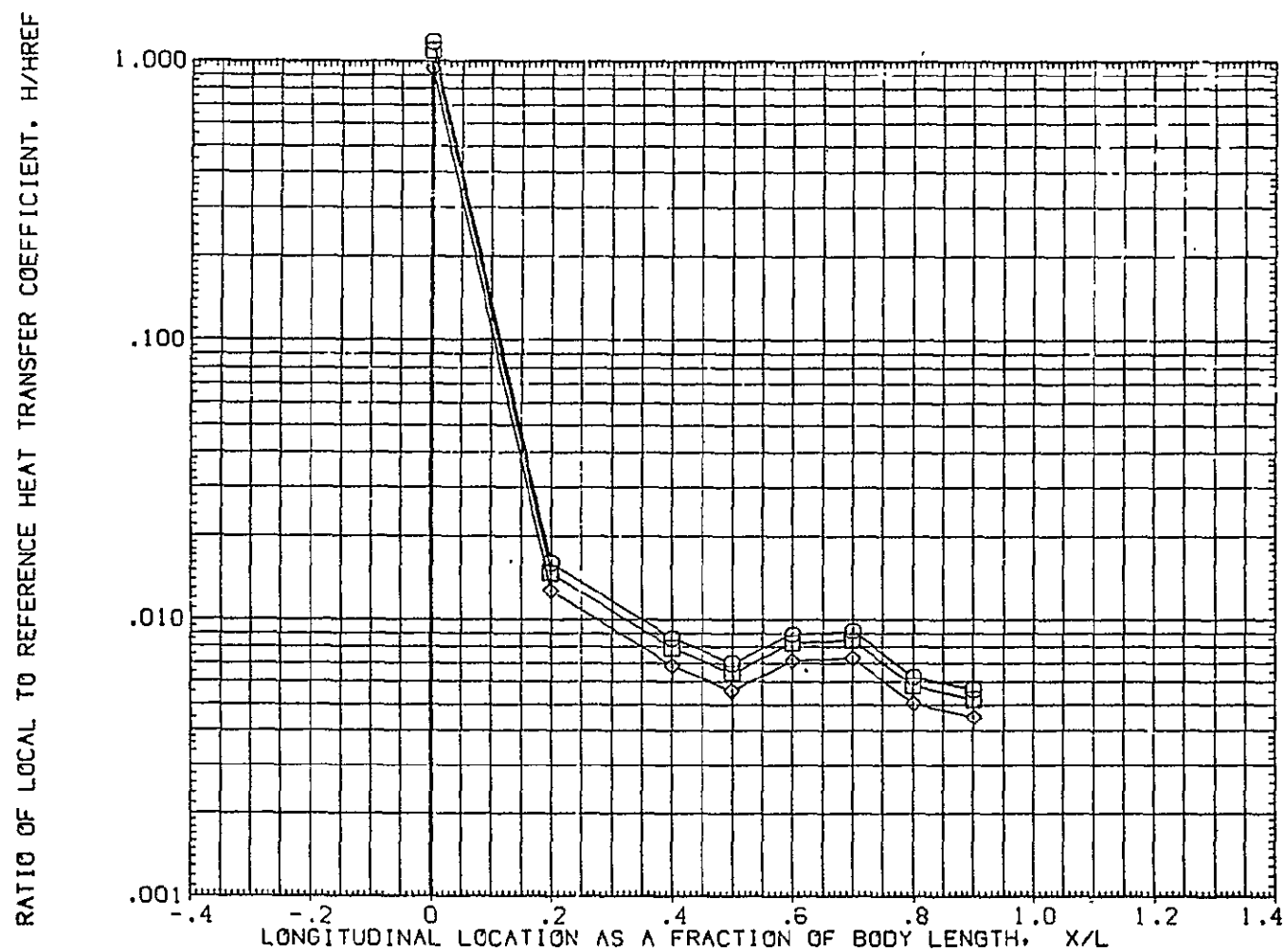


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ $\alpha = 0$

CH12/iH21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAV/HT	PHI	MACH	PARAMETRIC VALUES		
◇	.850	315.000	7.618	ALPHA	.000	BETA
□	.900					.000
○	1.000					

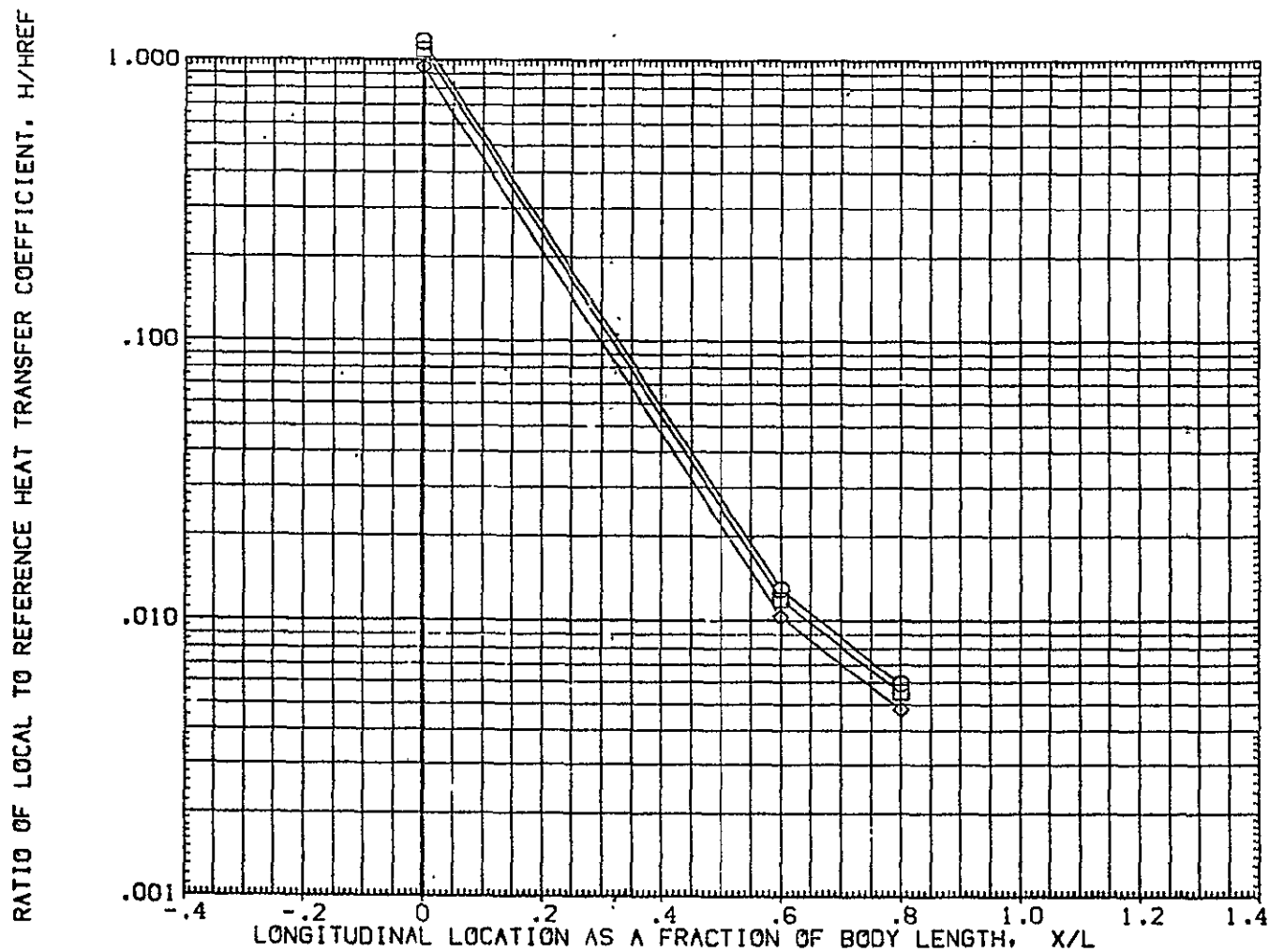


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/1H21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	MAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.850	.000	15.990		.000	BETA
□	.900					
◇	1.000					.000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

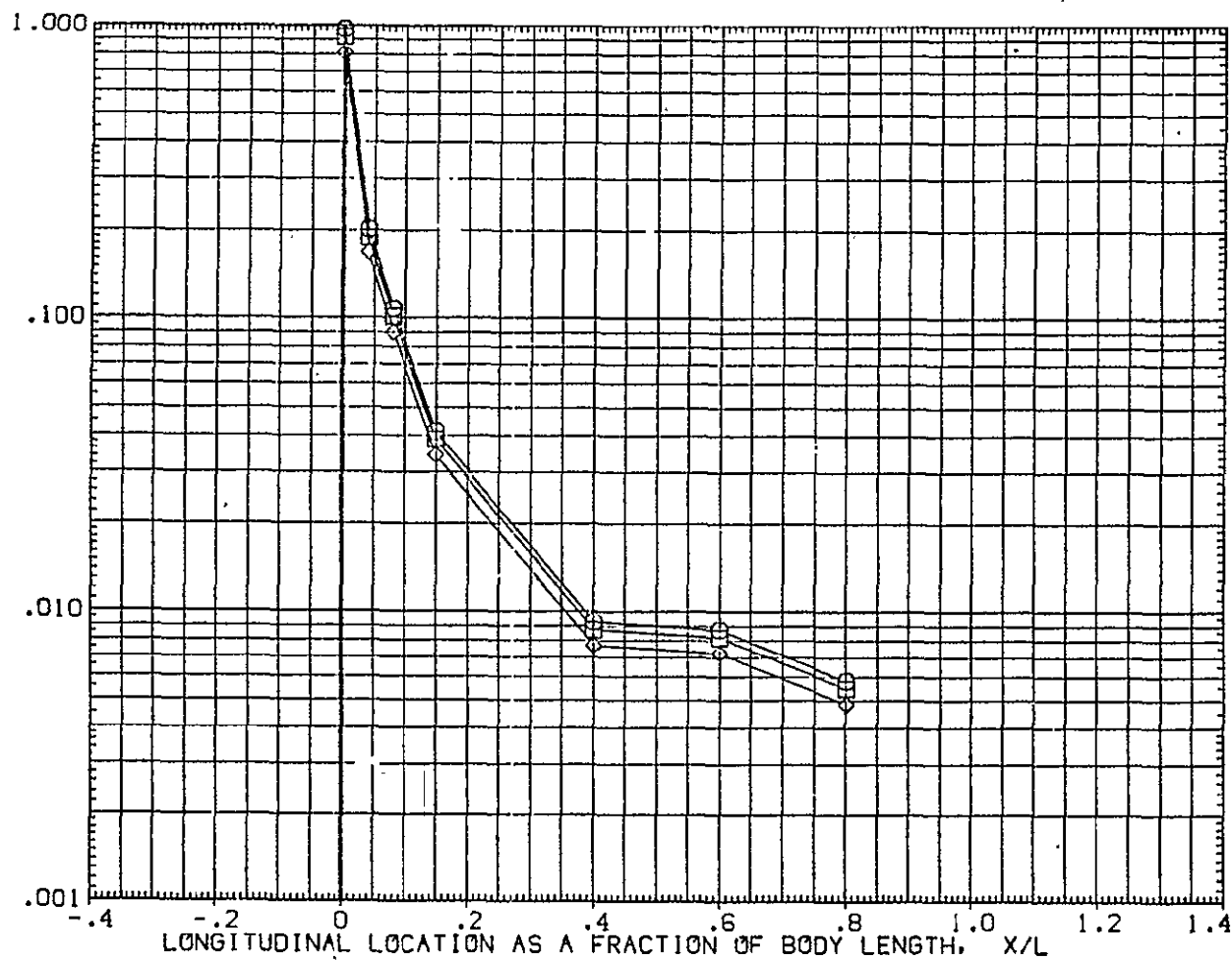


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 T

TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH
○	.850	180.000	15.990
□	.900		
◇	1.000		

PARAMETRIC VALUES	
ALPHA	BETA
.000	.000

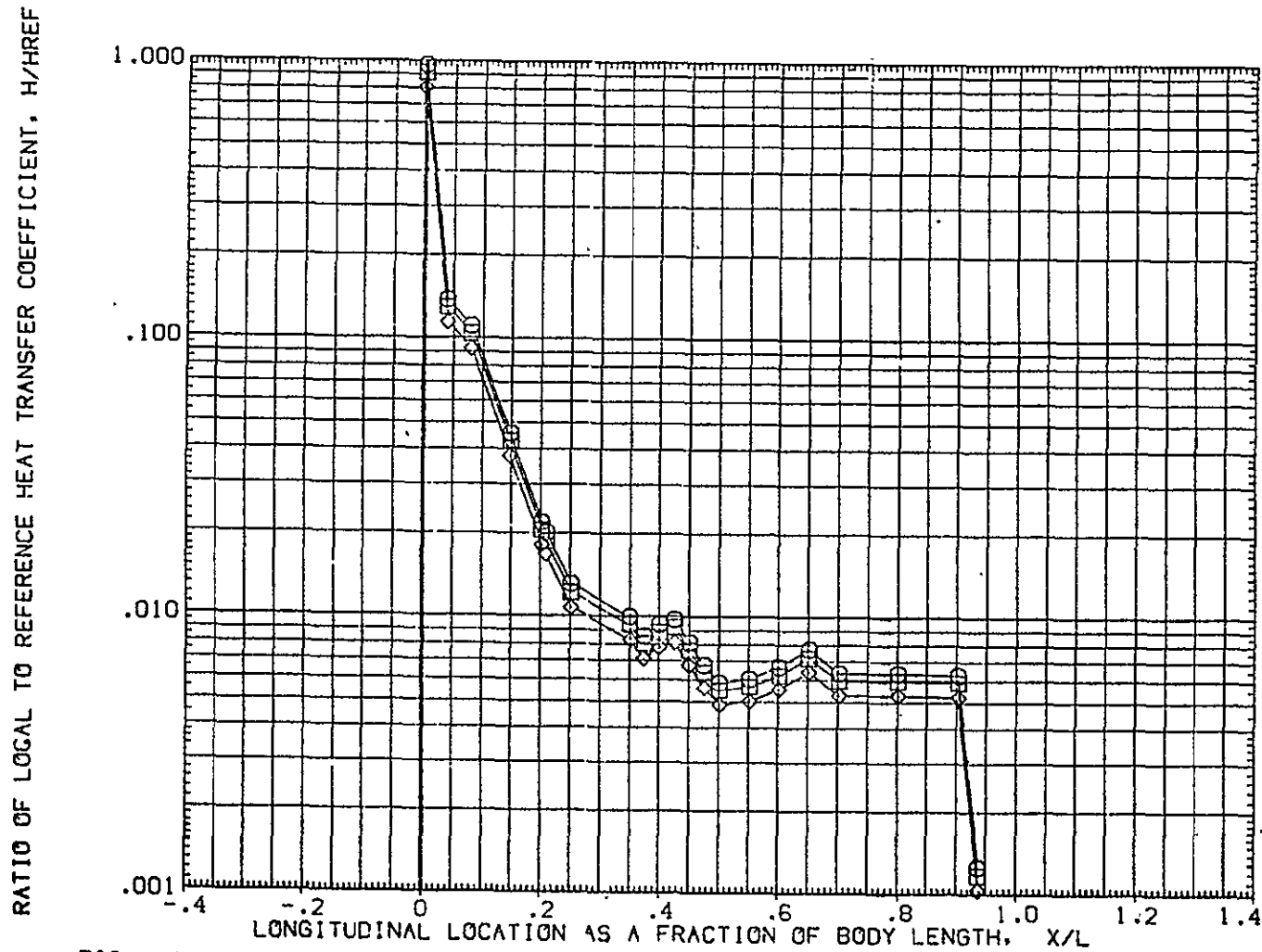


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	199.000	15.990	.000		.000
□	.900					
◇	1.000					

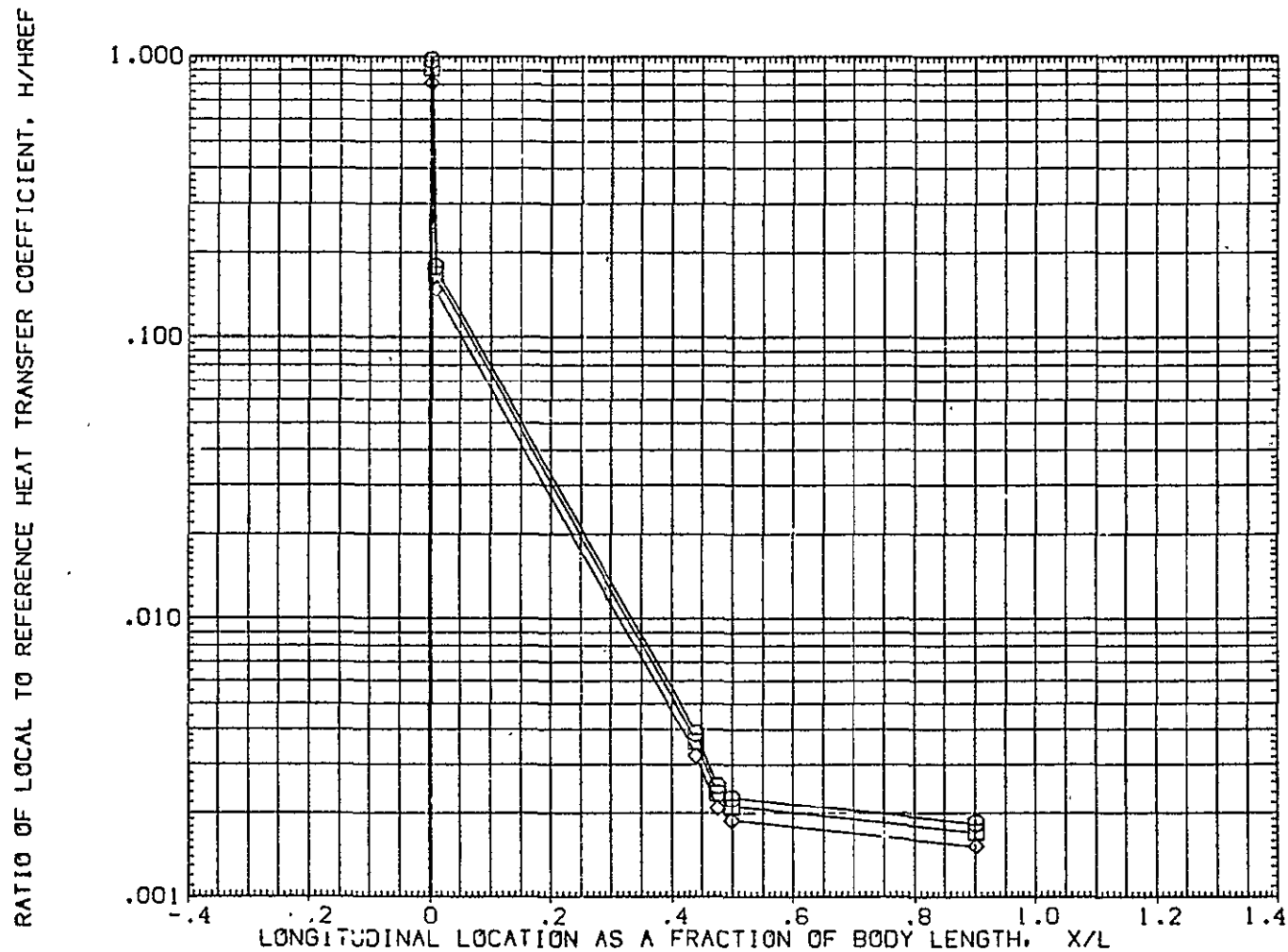


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/L_1 ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 T TANK (SUGTO1)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	221.000	15.990	ALPHA	.000	BETA
□	.900					.000
◇	1.000					

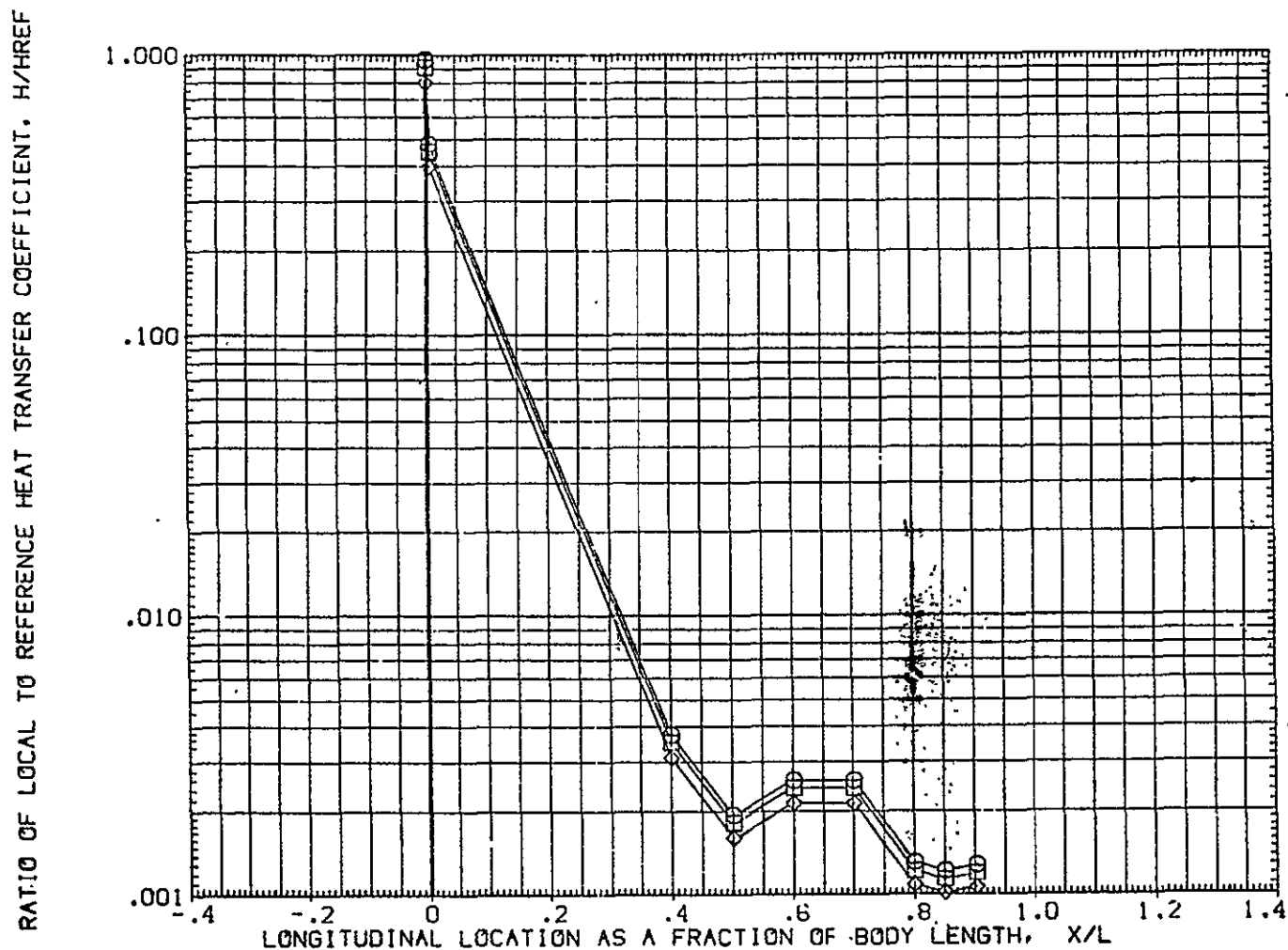


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

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CH12/IH21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	241.000	15.990	.000	.000	.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{ref}

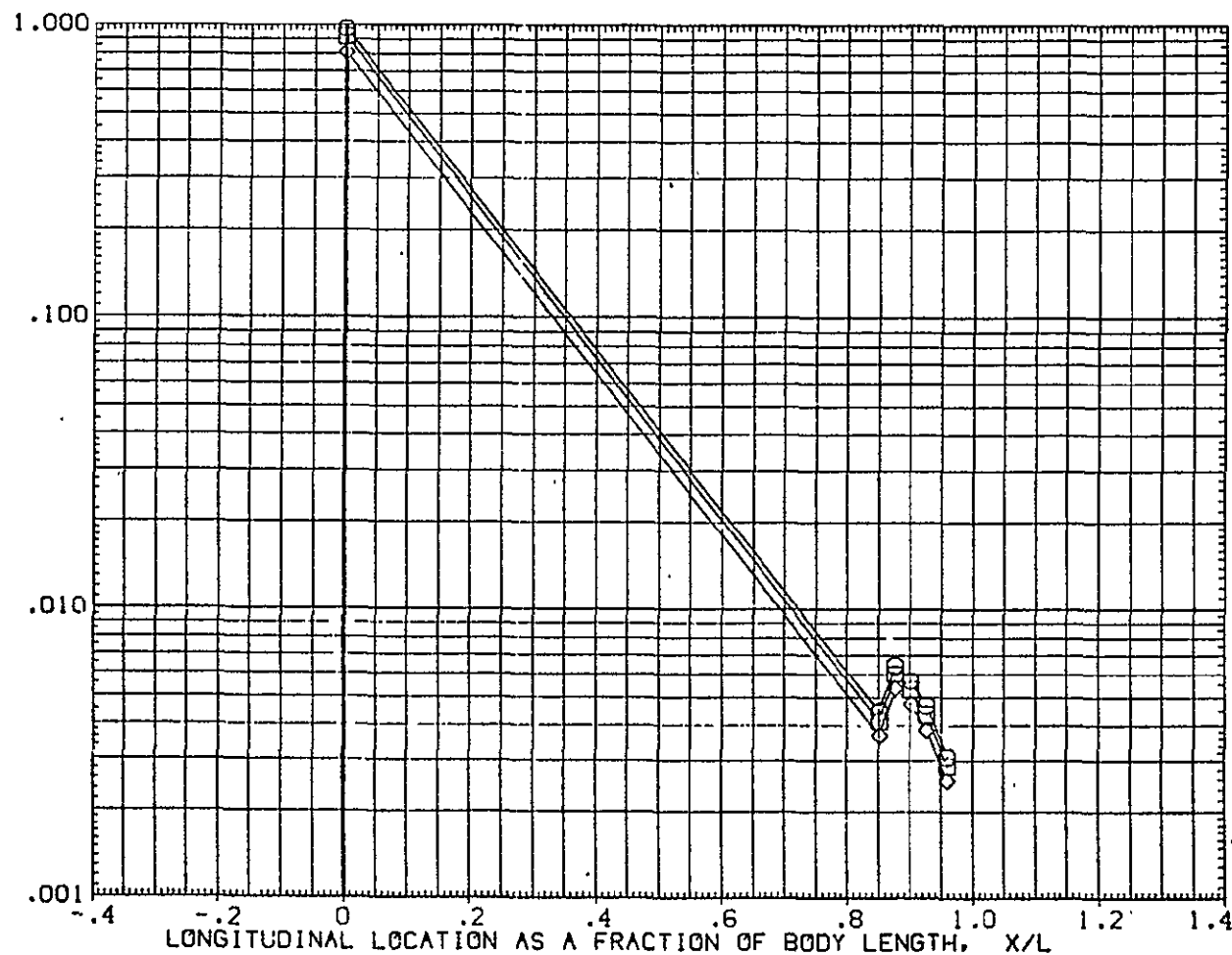


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	247.000	15.990	.000	.000	.000
□	.900					
◇	1.000					

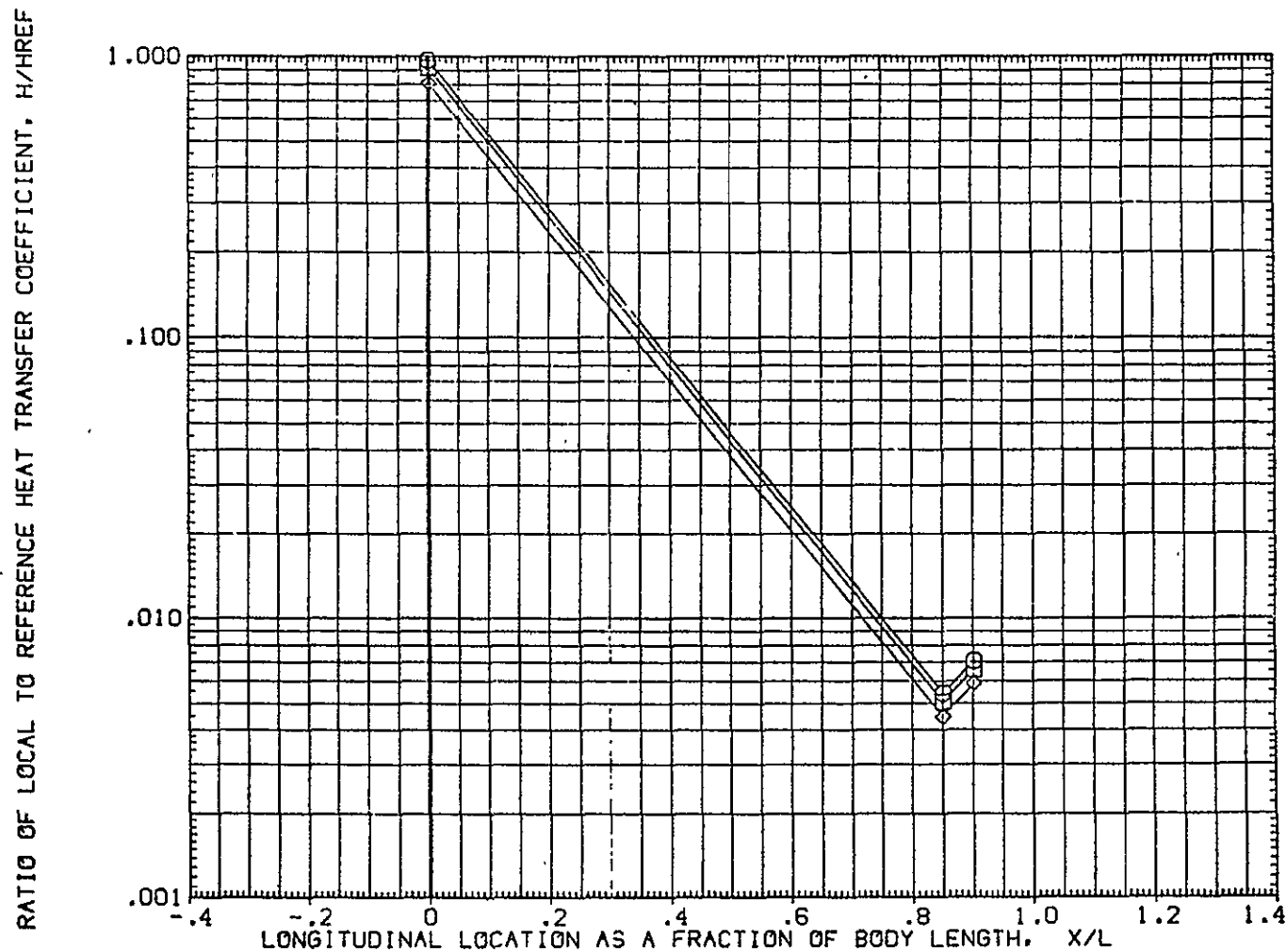


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 T

TANK

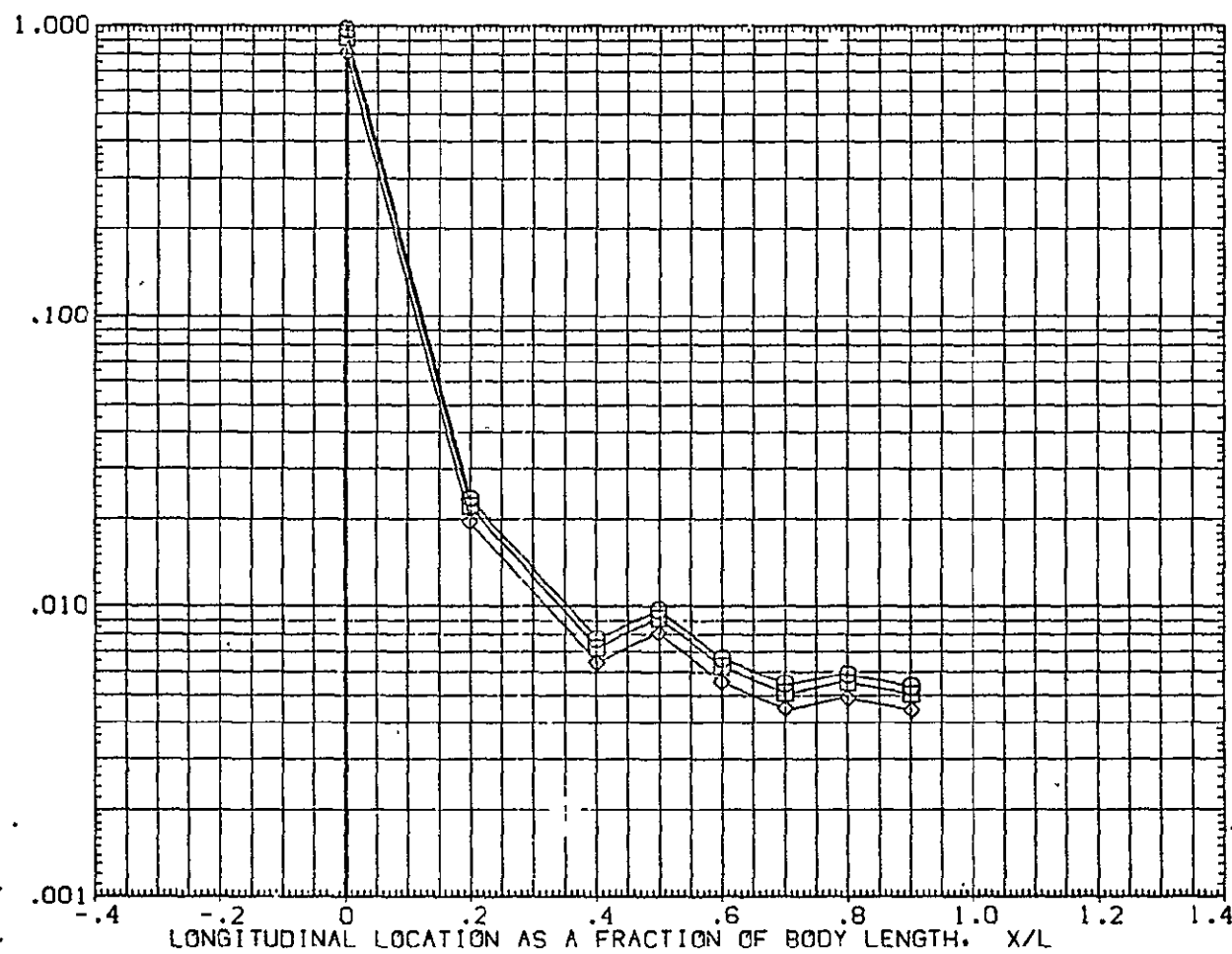
(SUGT01)

SYMBOL
□
◇HAW/HT
.850
.900
1.000PHI
270.000MACH
15.990

ALPHA

PARAMETRIC VALUES
.000 BETA

.000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/L ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
◇◇◇	.850	315.000	15.990	ALPHA	.000	BETA
	.900					
	1.000					.000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

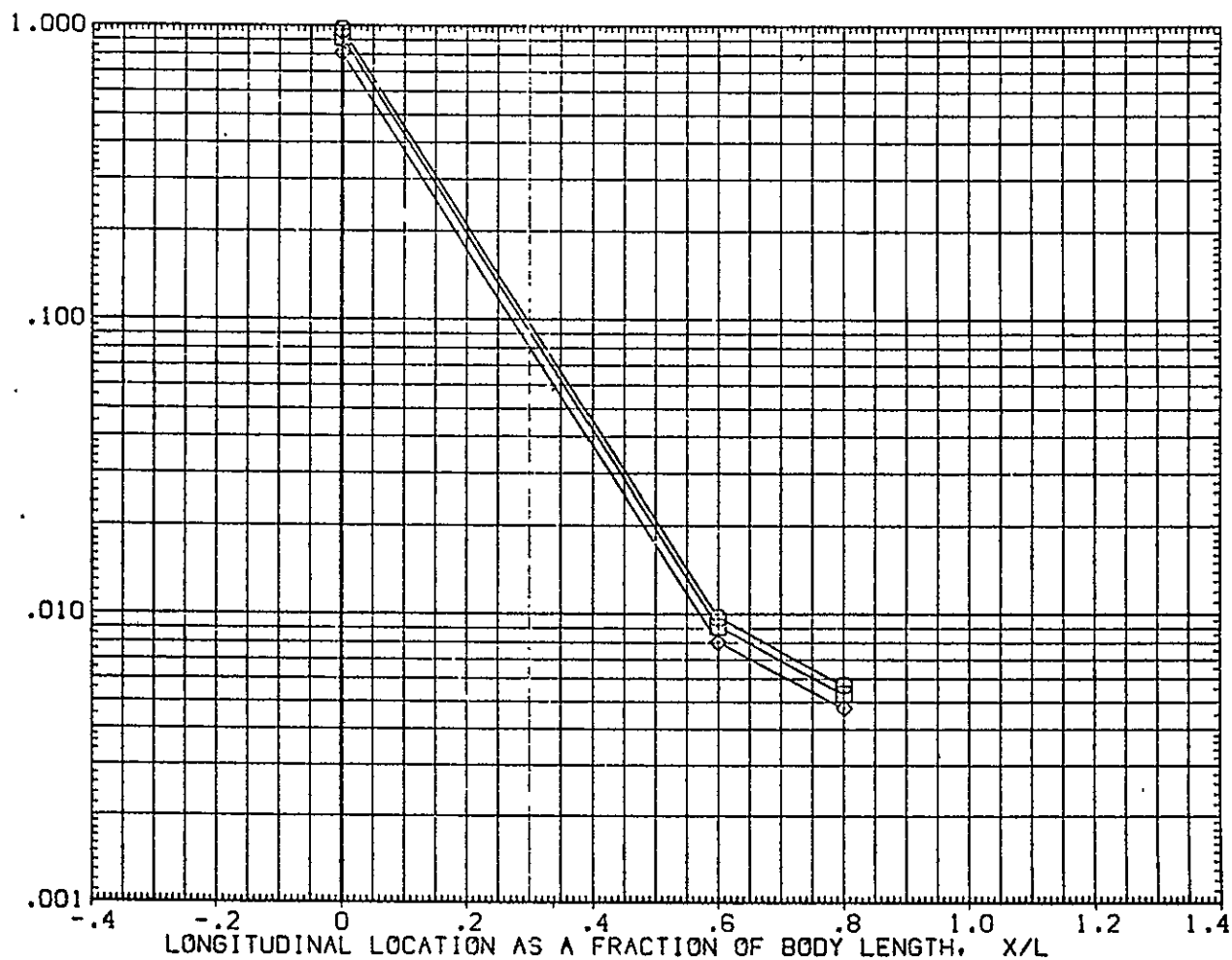


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 T

TANK

(SUGT01)

SYMBOL
○
□
◇

HAW/HT
.850
.900
1.000

PHI

.000

MACH
18.370

PARAMETRIC VALUES

ALPHA

.000

BETA

.000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

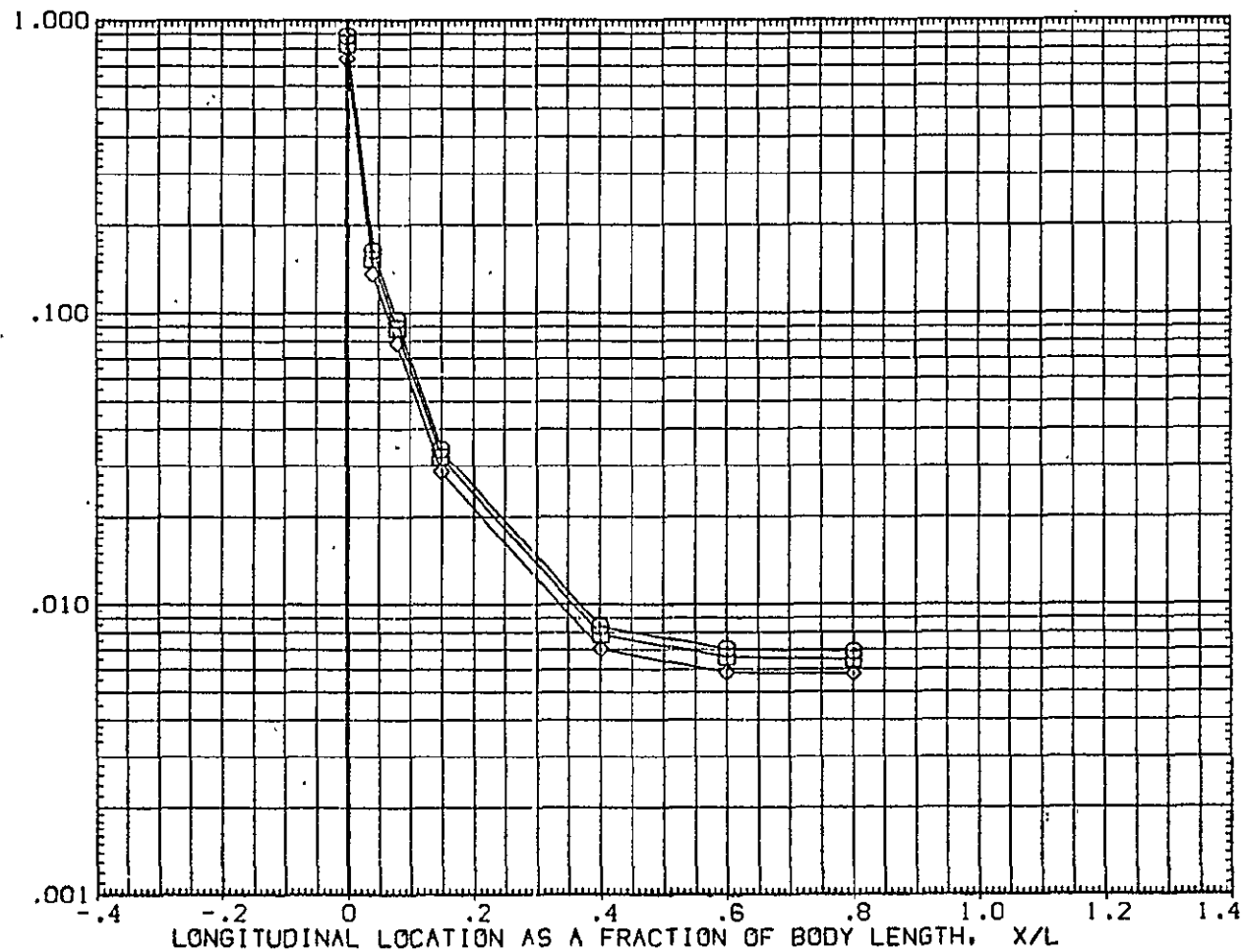


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

CH12/IH21 (CAL HST 173-100) 37 T

TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
◇	.850	180.000	18.370	ALPHA	.000	BETA
□	.900					
○	1.000					

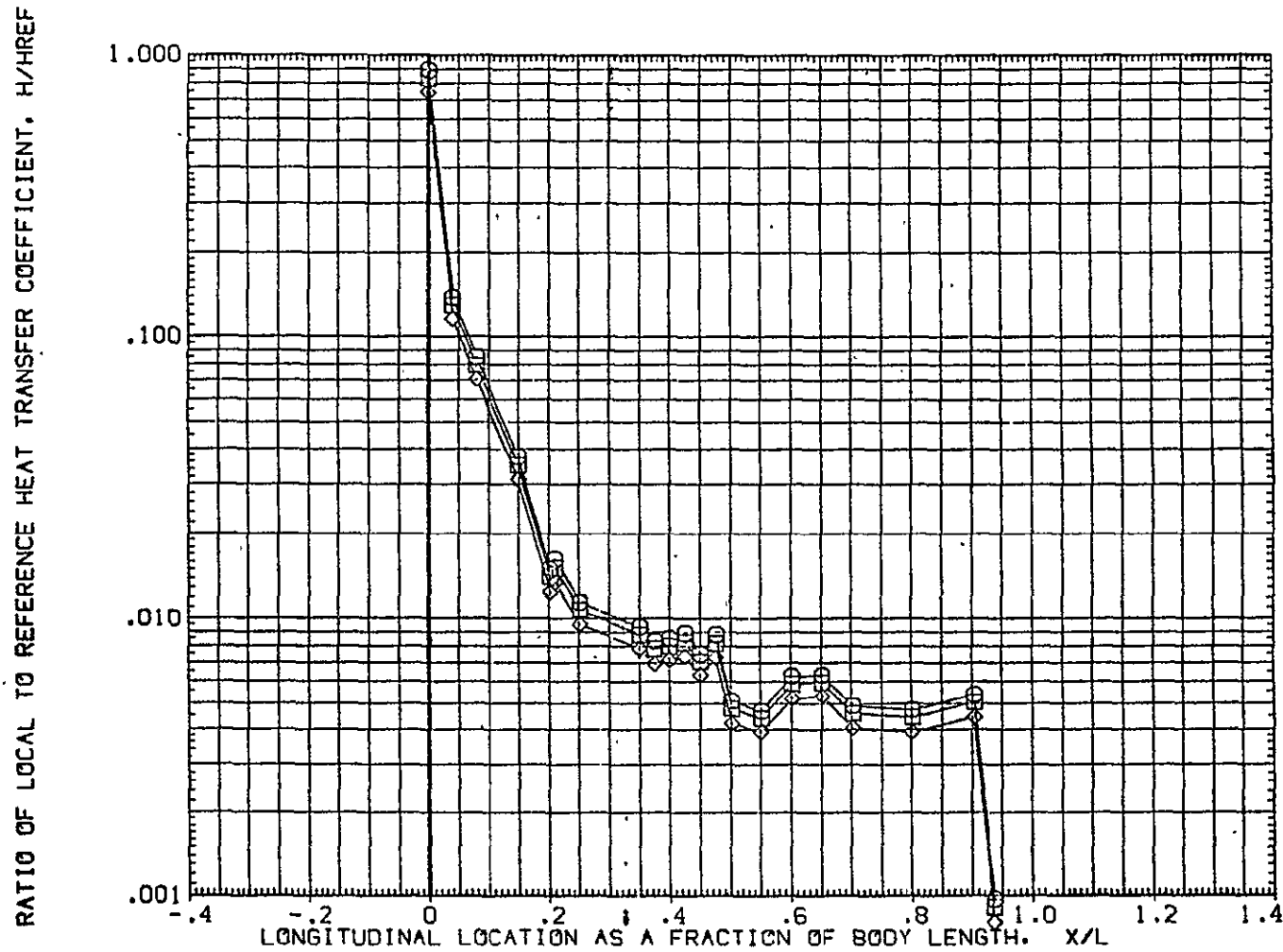


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 T TANK (SUGTO1)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	199.000	18.370	.000	.000	.000
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

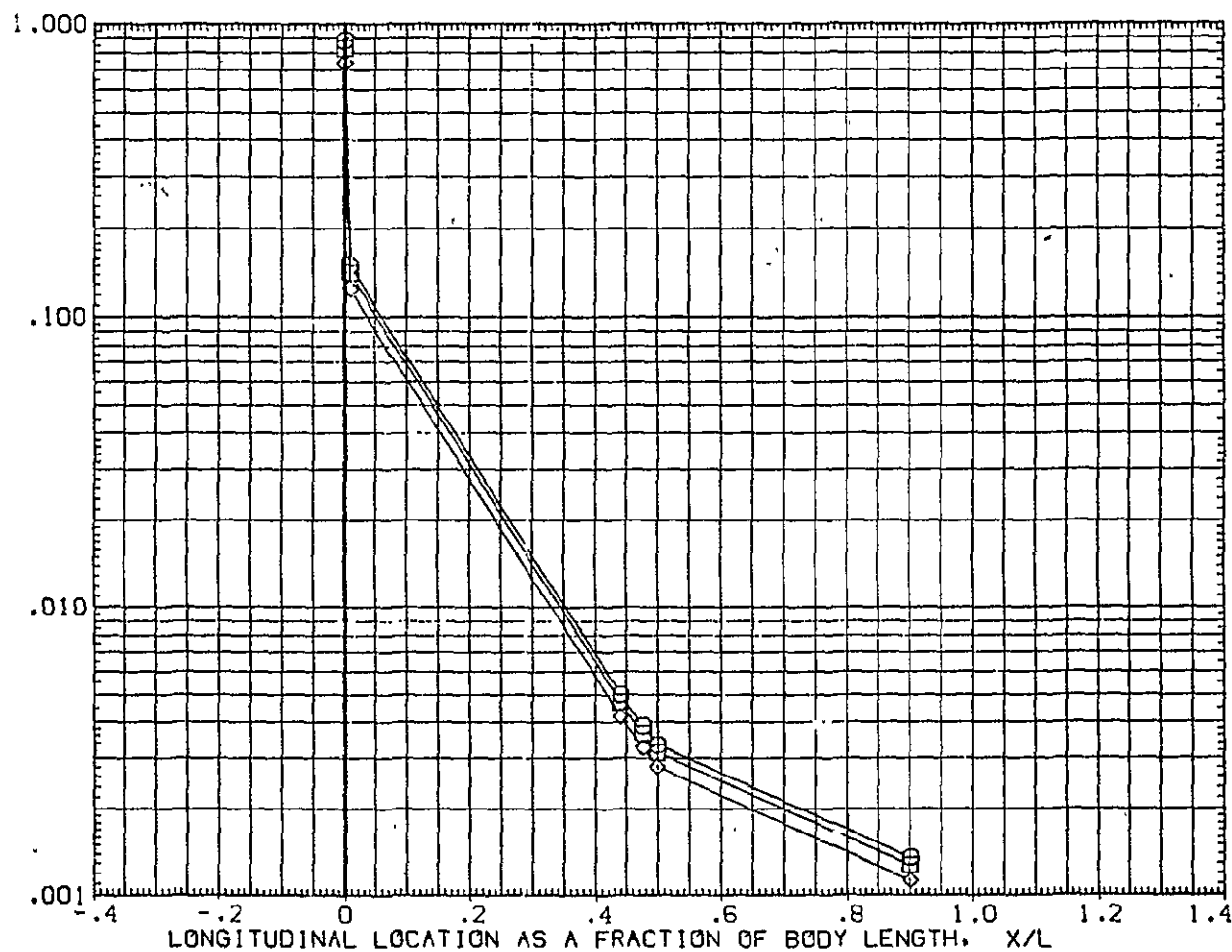


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

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OH12/IH21 (CAL HST 173-100) 37 T TANK (SUGTO1)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	221.000	18.370	.000	.000	.000
◇	.900					
	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

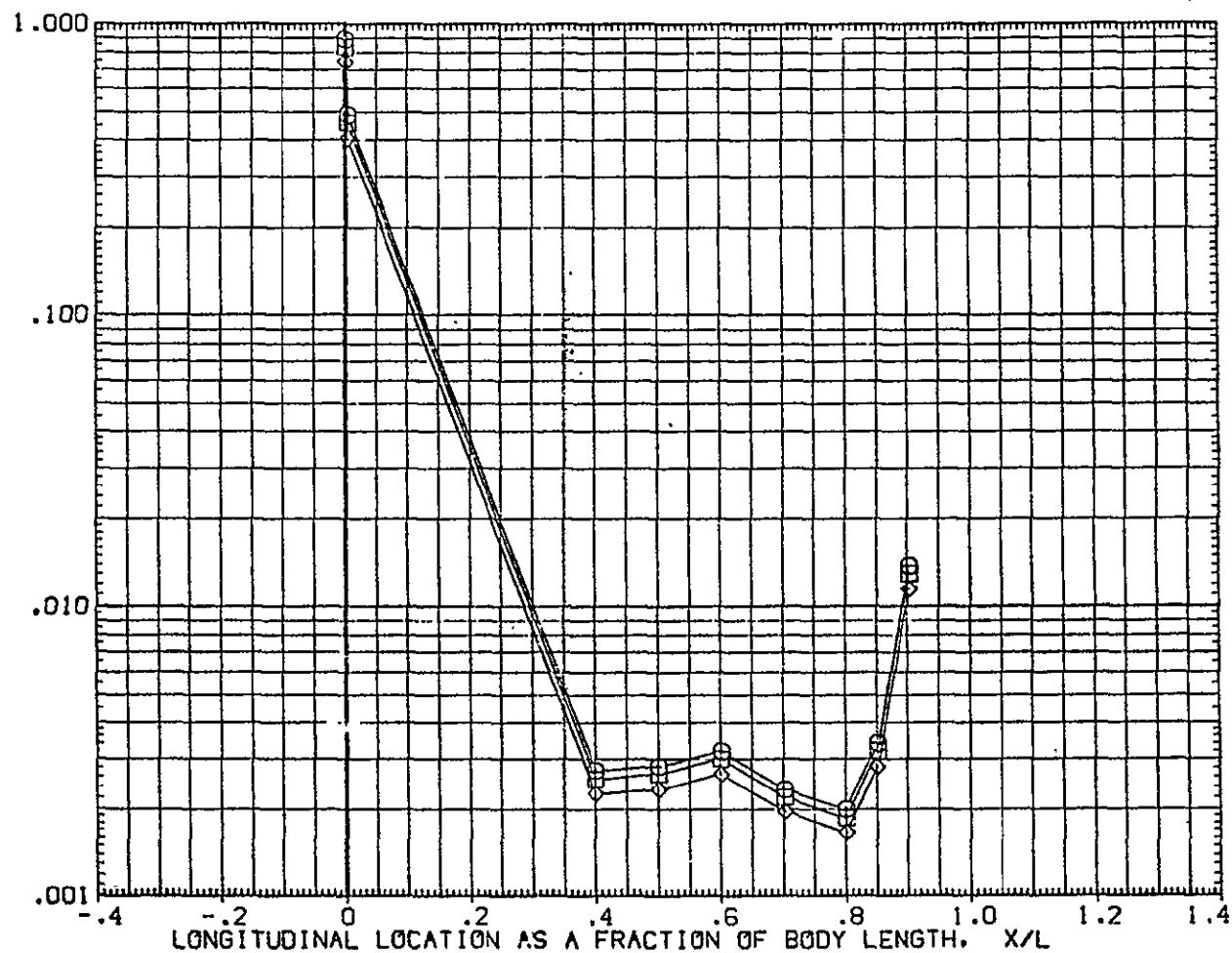


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 T

TANK (SUGTO1)

SYMBOL	HAW/HT	PHI	MACH
○	.850	241.000	18.370
□	.900		
◇	1.000		

PARAMETRIC VALUES		
ALPHA	BETA	
.000		.000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

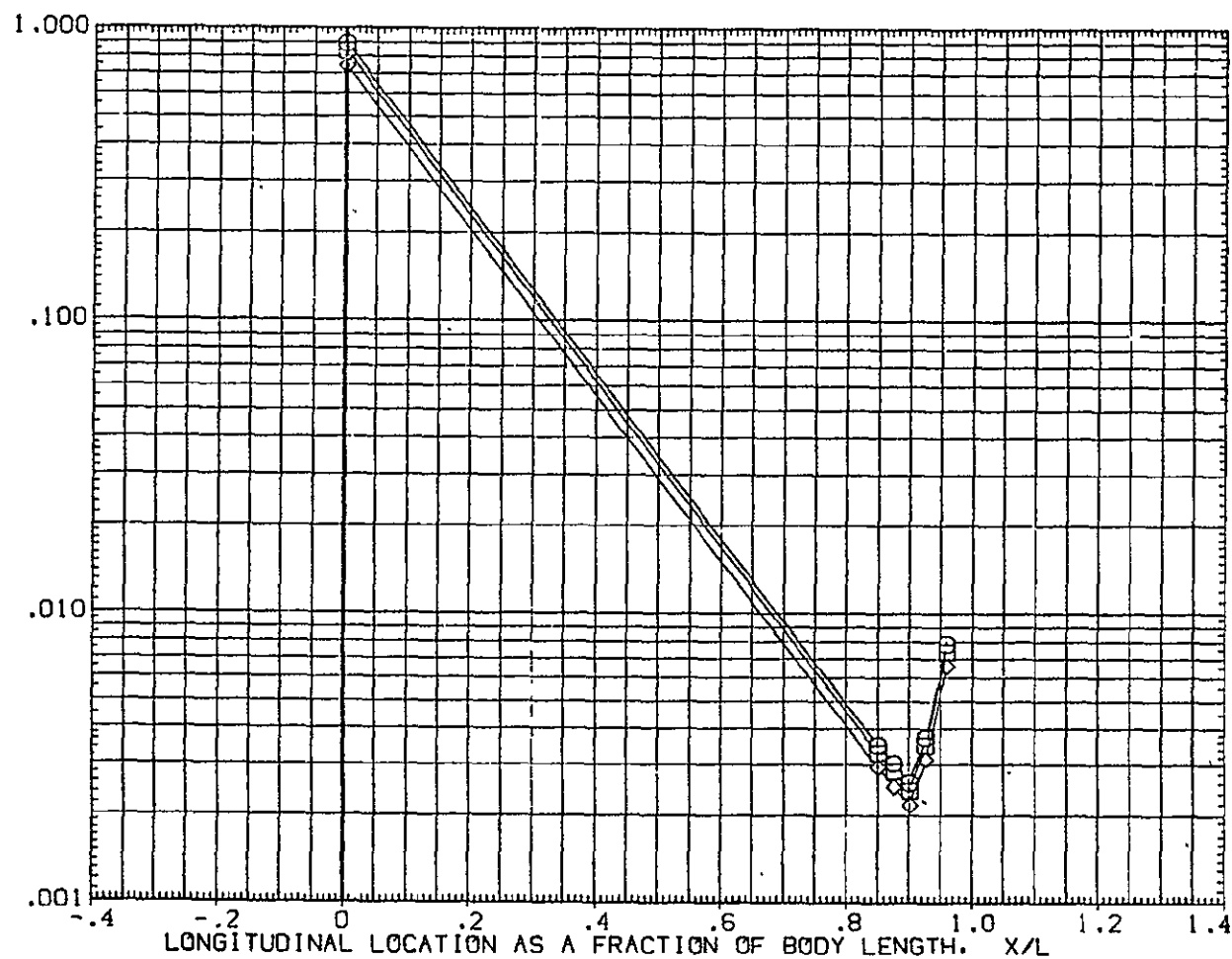


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAM/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	247.000	18.370	.000	.000	.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

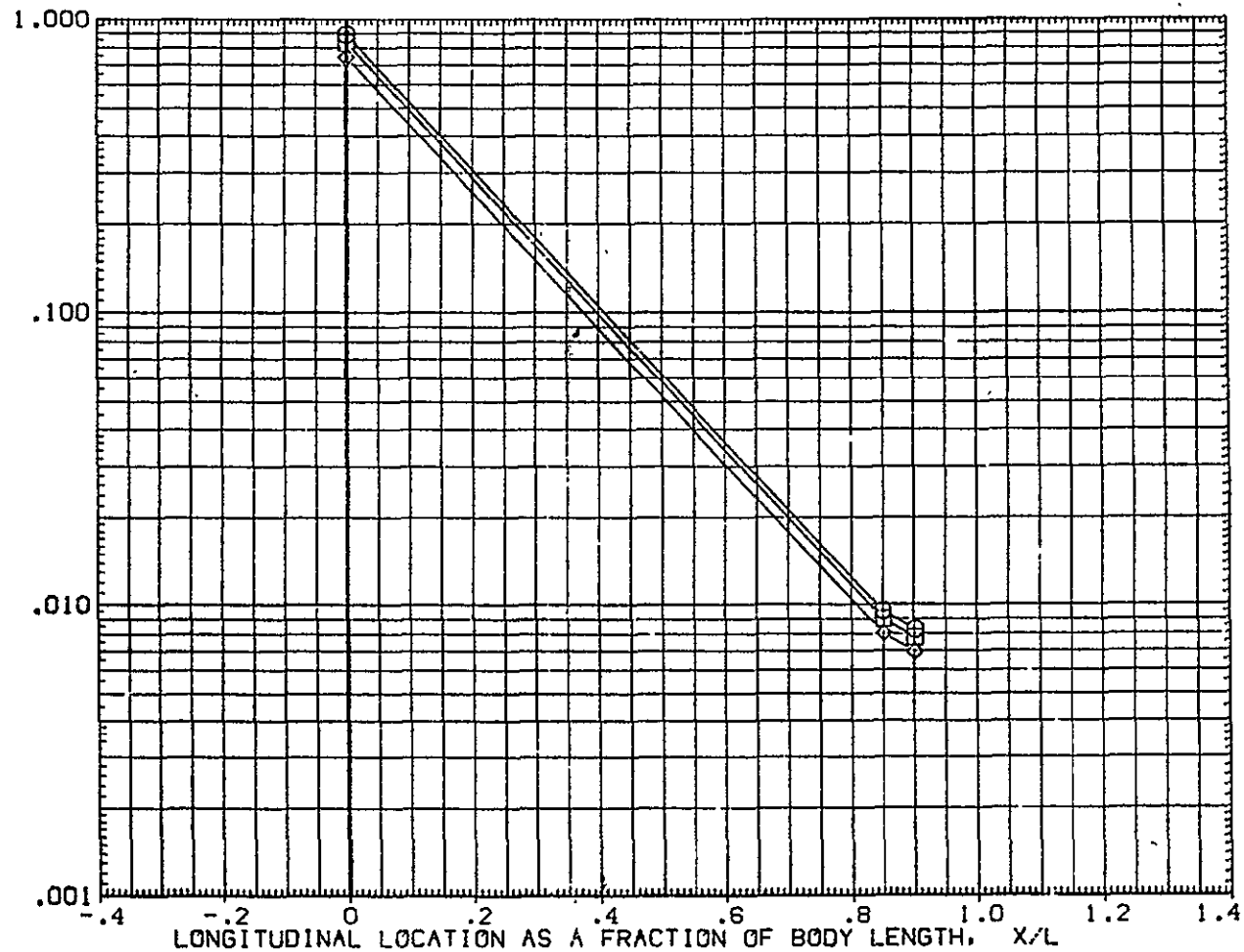


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	BETA
○	.850	270.000	18.370	.000	.000
□	.900				
◇	1.000				

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

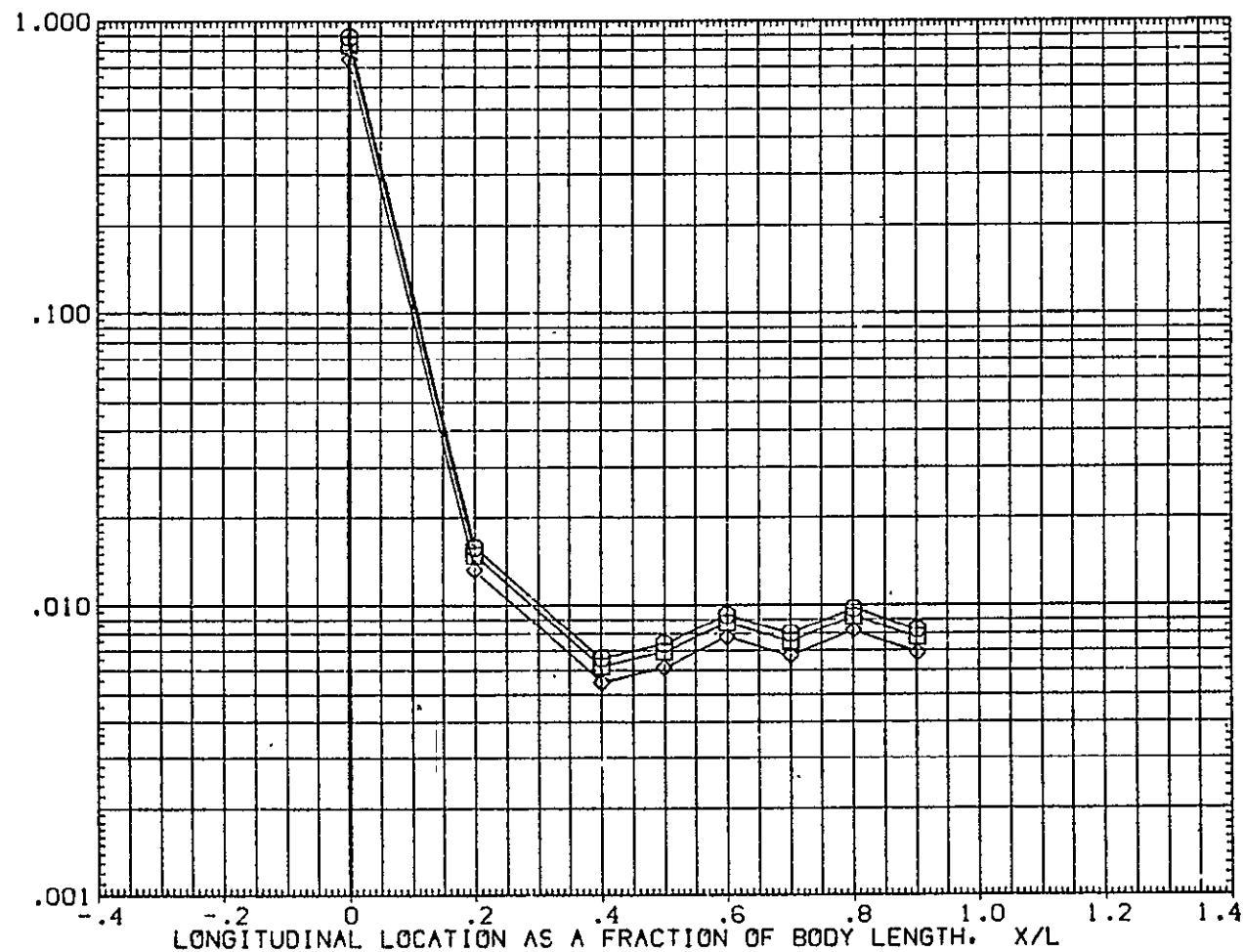


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	315.000	18.370	.000	.000	.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

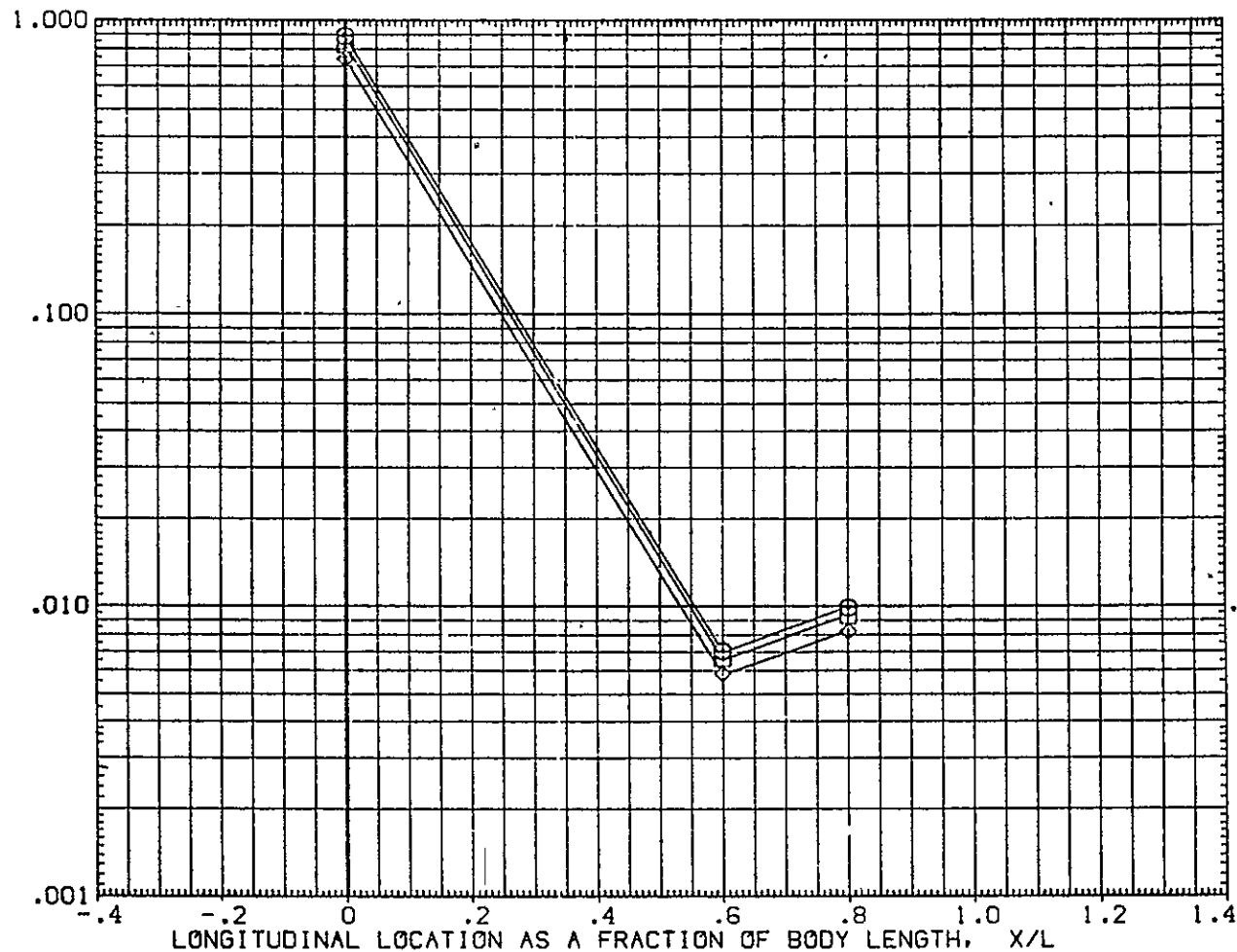


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 T

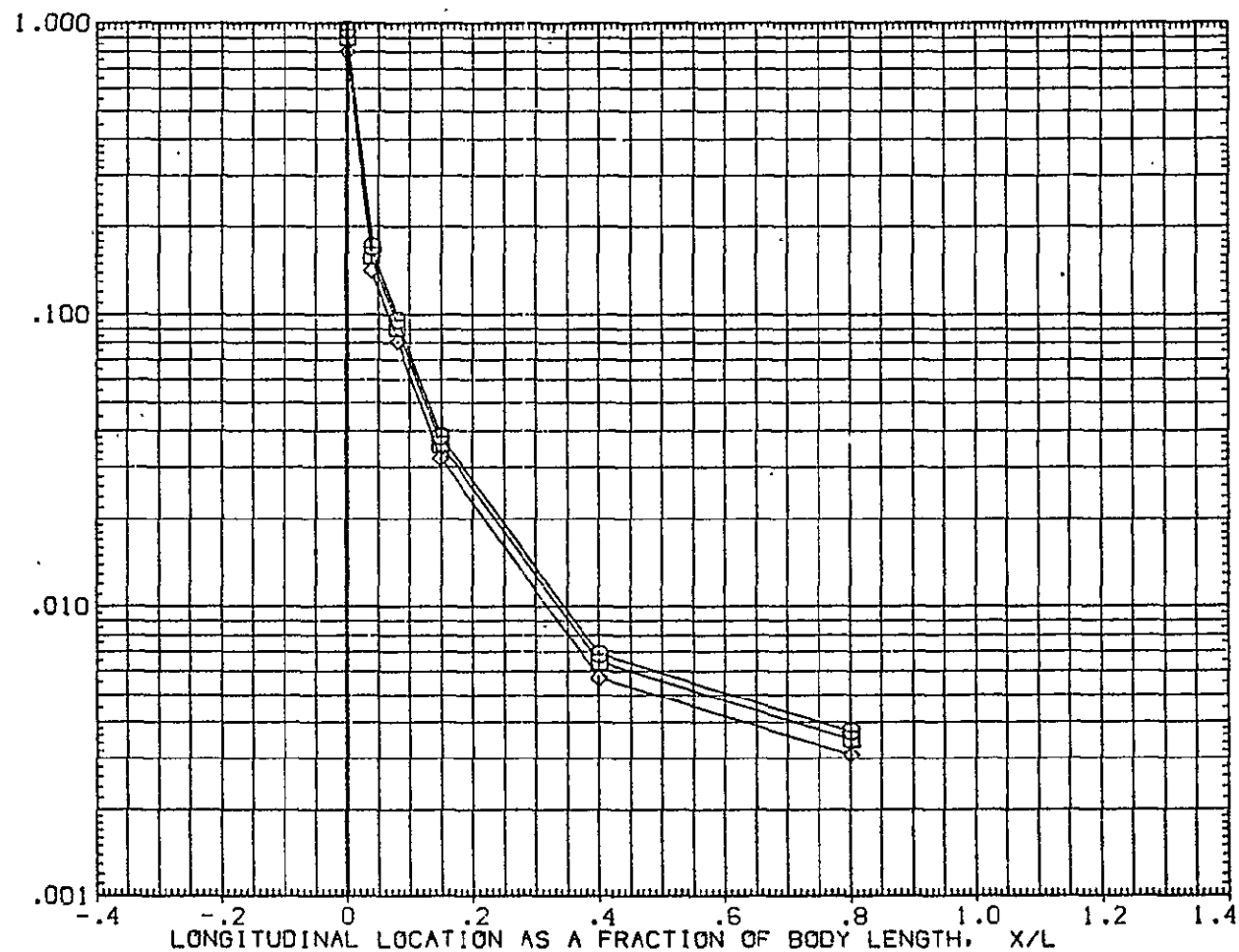
TANK (SUGTO1)

SYMBOL
◇ □ ○HAW/HT
.850
.900
1.000PHI
.000MACH
19.130

ALPHA

PARAMETRIC VALUES
.000 BETA

.000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/L_1 ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	180.000	19.130	.000	.000	.000
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

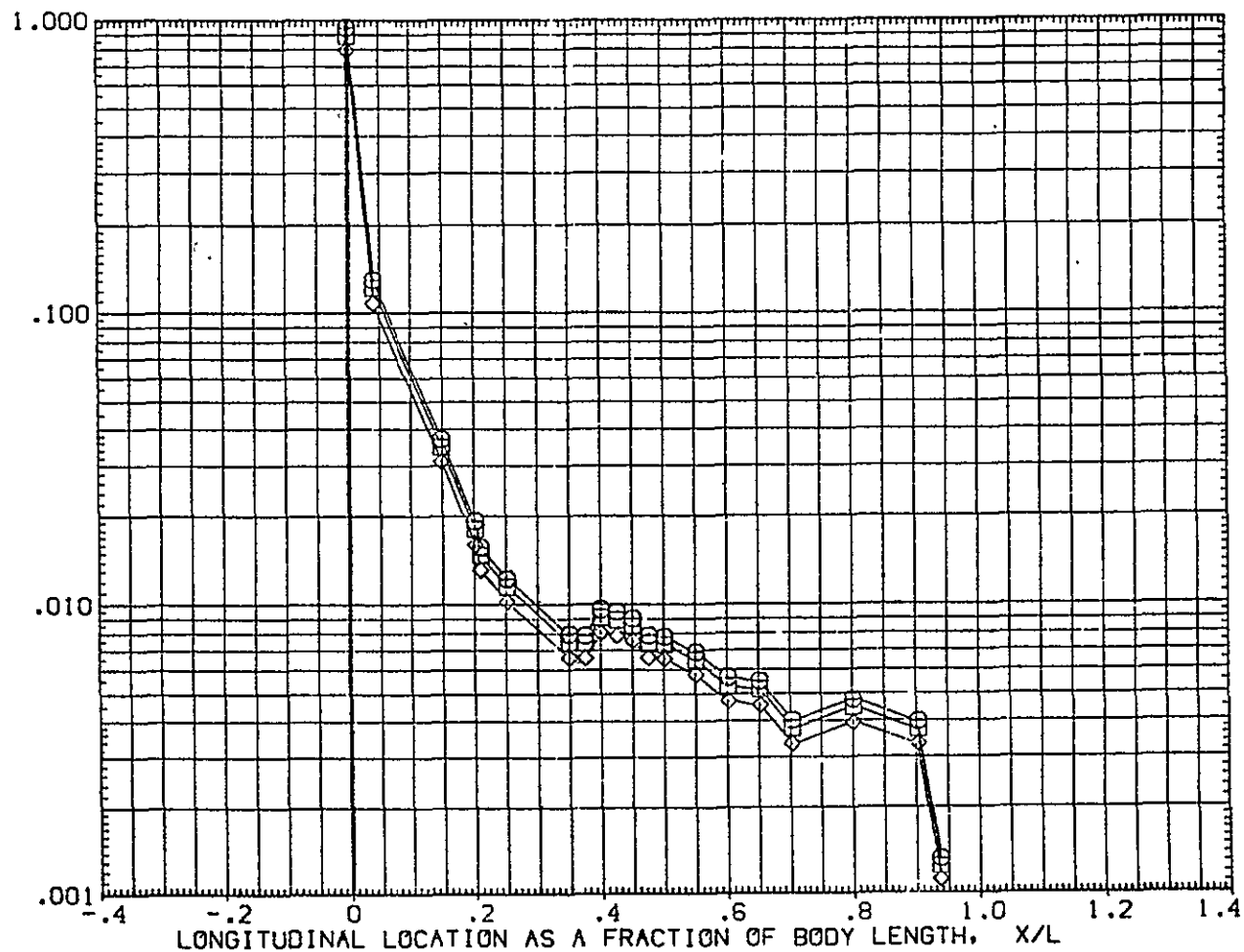


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12/IH2! (CAL HST I73-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	PACH	ALPHA	PARAMETRIC VALUES		BETA	
◇	.850	199.000	19.130		.000			.000
□	.900							
○	1.000							

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT: H/H_{REF}

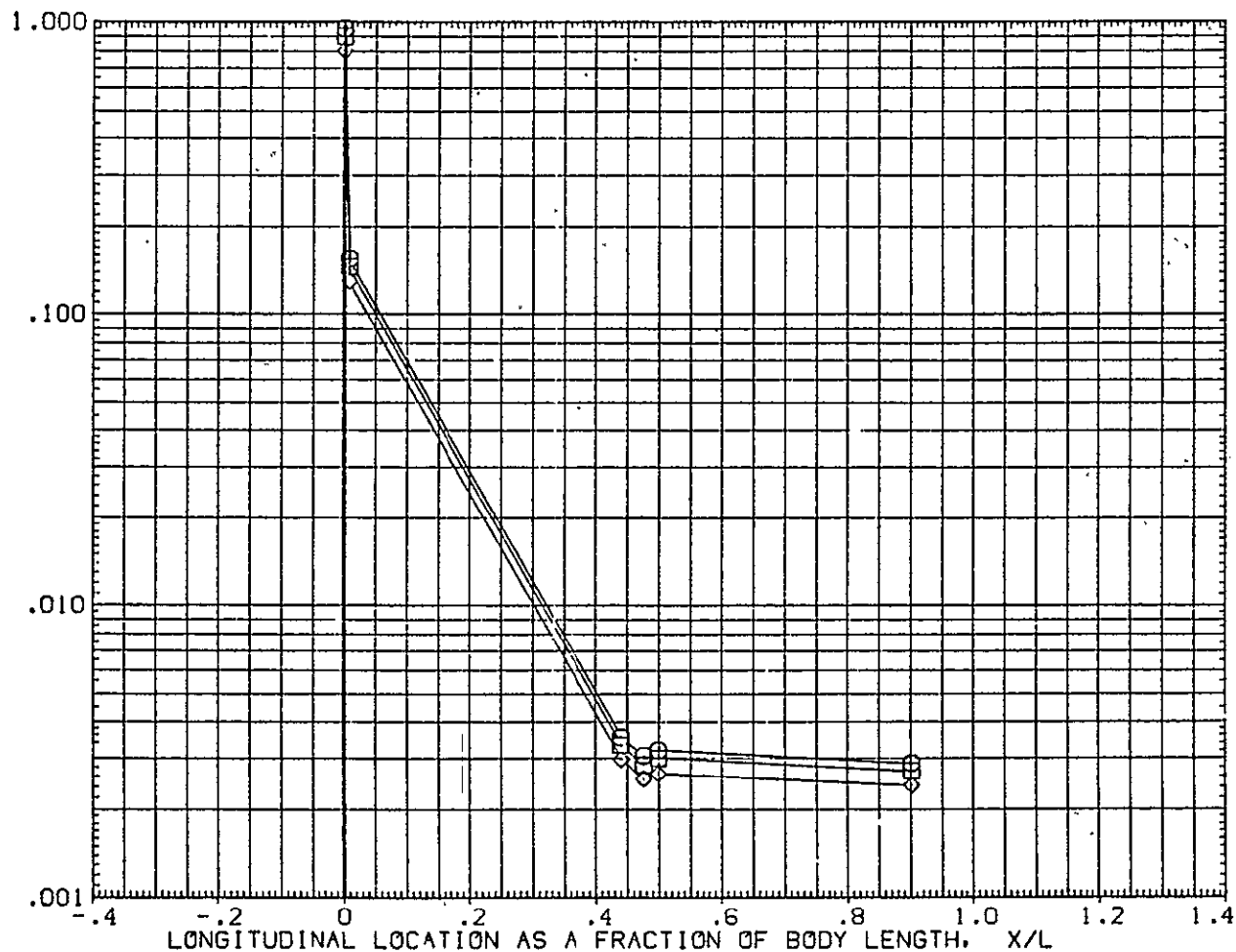


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 T

TANK

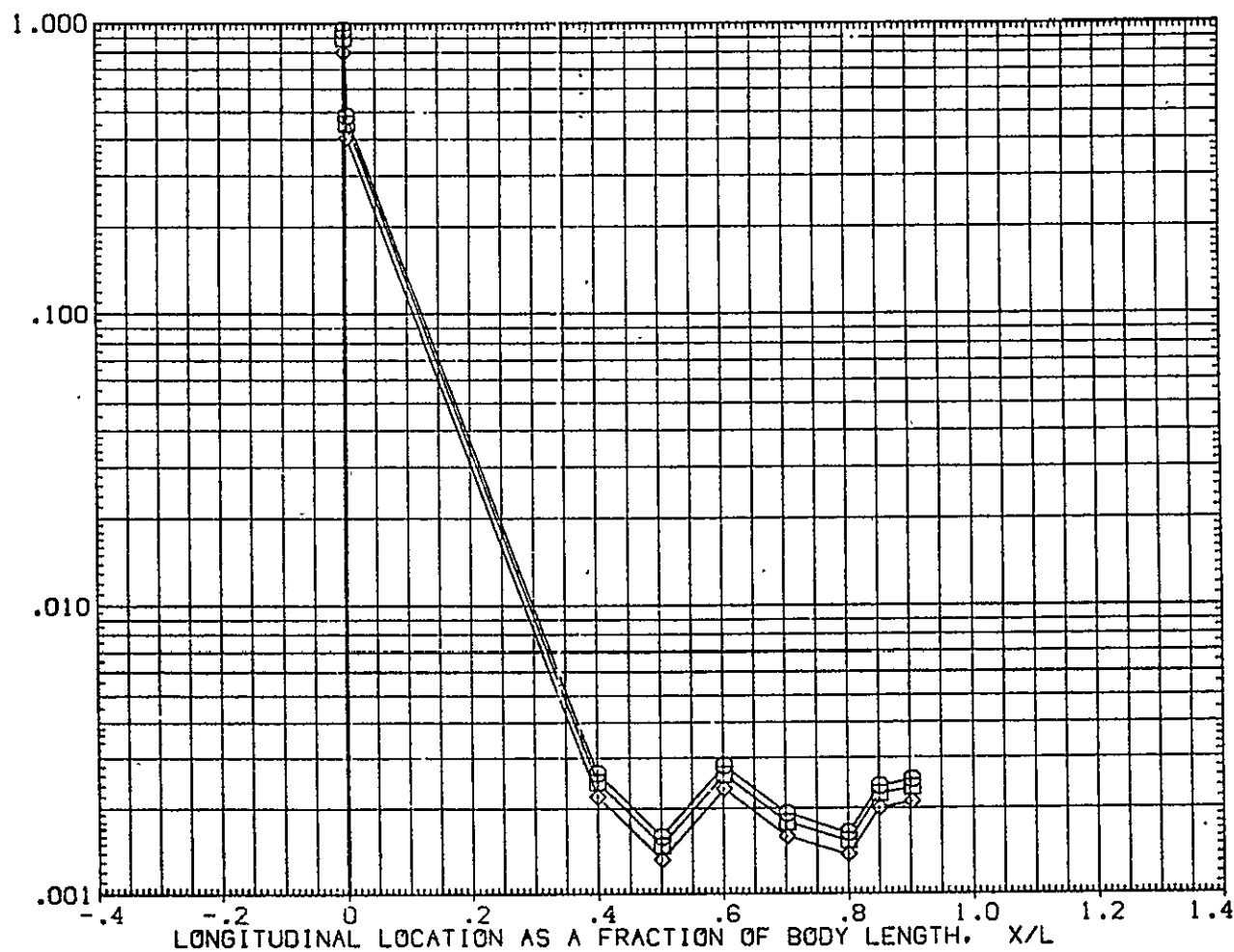
(SUGT01)

SYMBOL
◇ □ ○HAW/HT
.850
.900
1.000PHI
221.000MACH
19.130

ALPHA

PARAMETRIC VALUES
.000 BETA

.000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF} FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

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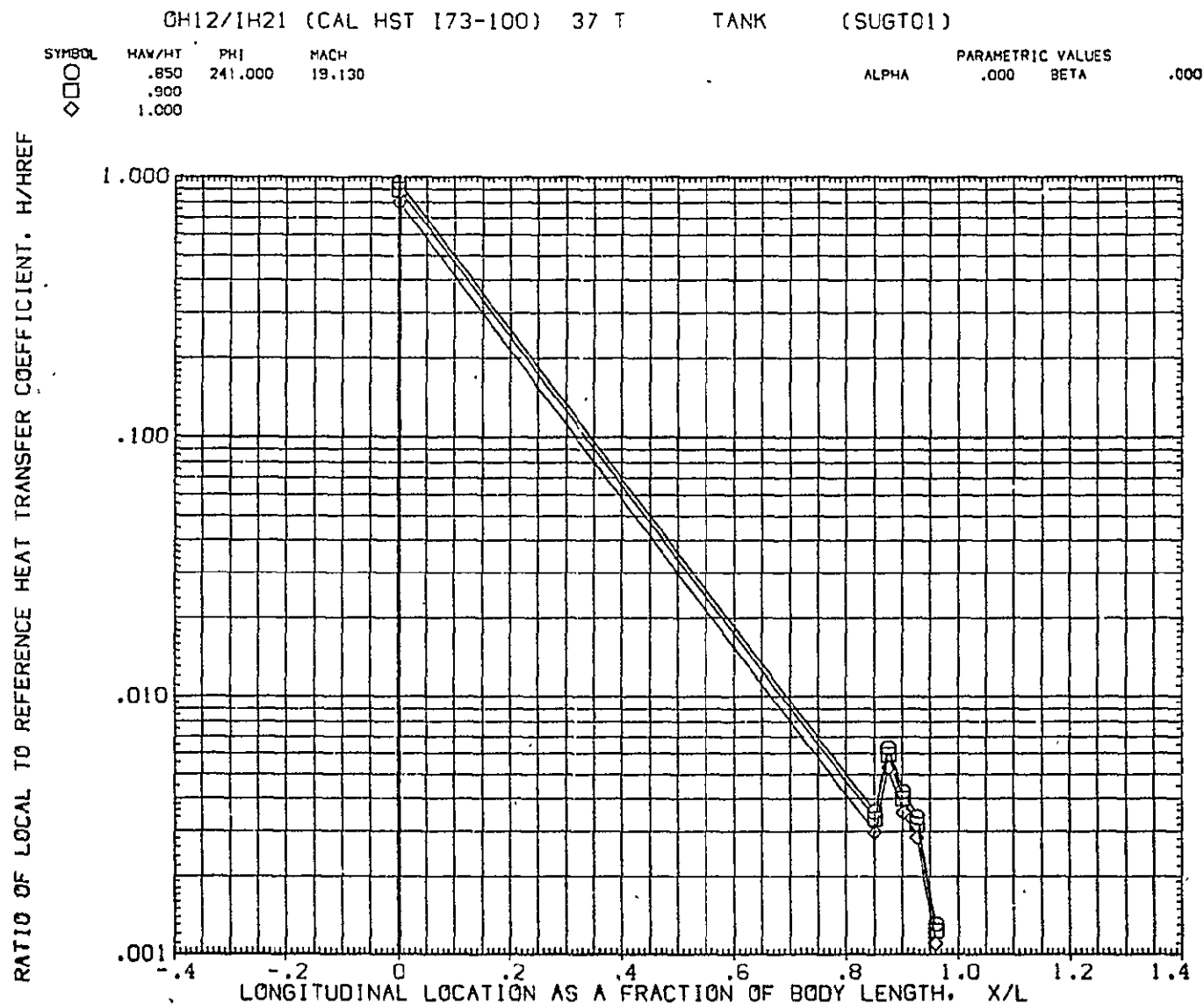


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/L ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 T

TANK

(SUGT01)

SYMBOL

HAW/HT

PHI

MACH

PARAMETRIC VALUES

ALPHA

BETA

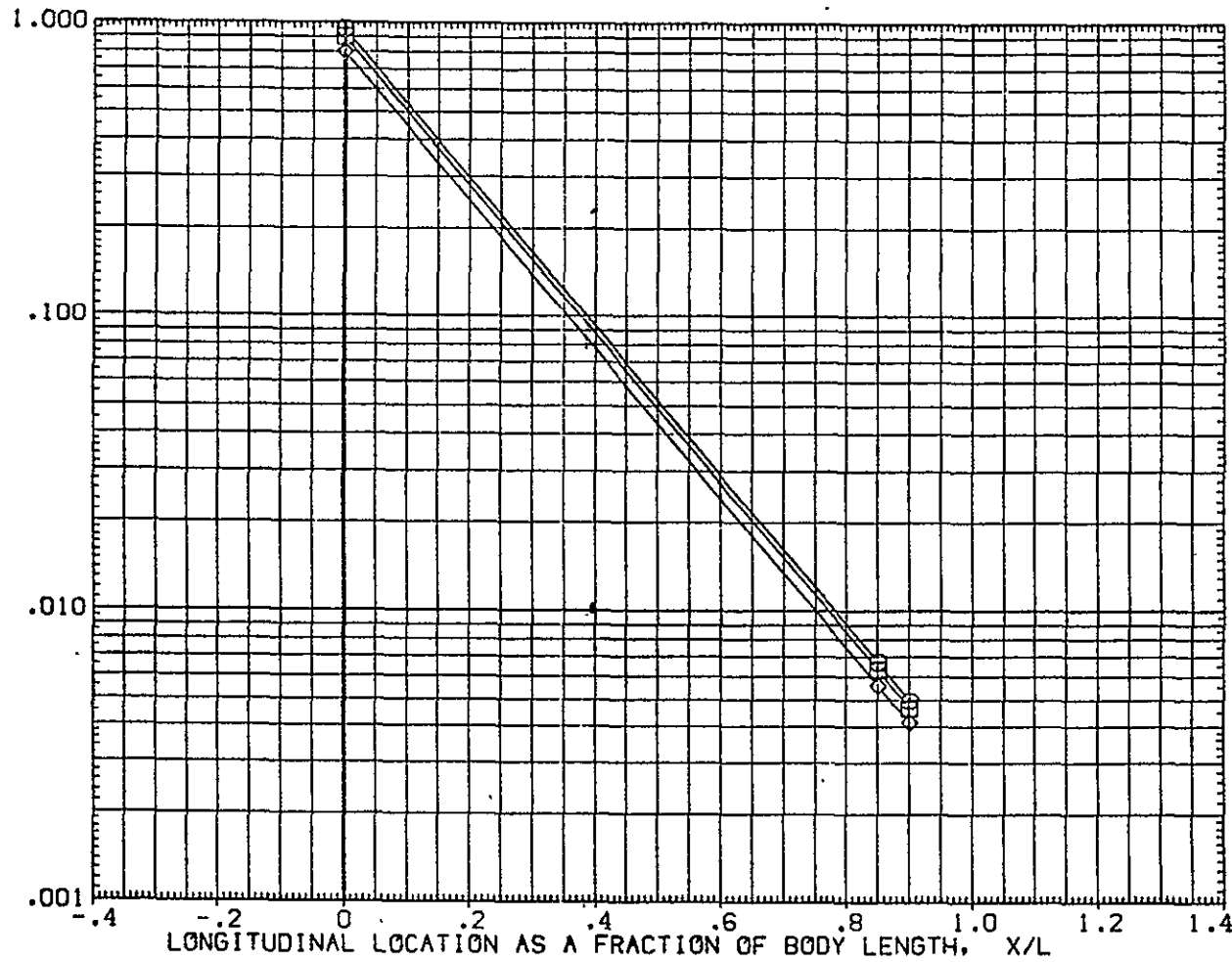
.000

\square
 \square
 \diamond

.850
 .900
 1.000

247.000

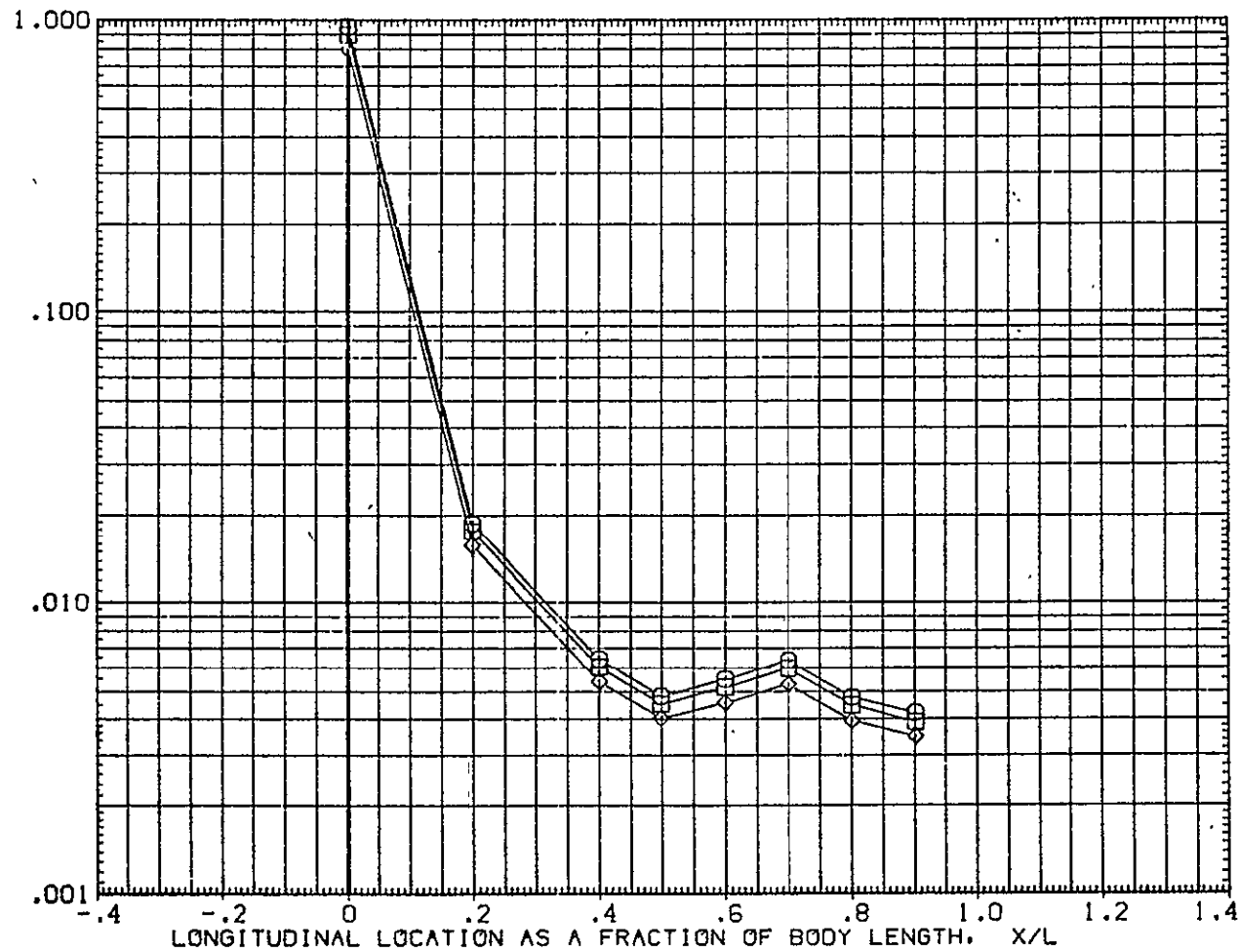
19.130

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF} FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/LI $\alpha = 0$

0H12/IH21 (CAL HST 173-100) 37 T

TANK

(SUGT01)

SYMBOL
○
□
◇HAW/HT
.850
.900
1.000PHI
270.000MACH
19.130PARAMETRIC VALUES
ALPHA .000 BETA .000RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

CH12/1H21 (CAL HST 173-100) 37 T TANK (SUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.650	315.000	19.130	ALPHA	.000	BETA
□	.900					.000
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

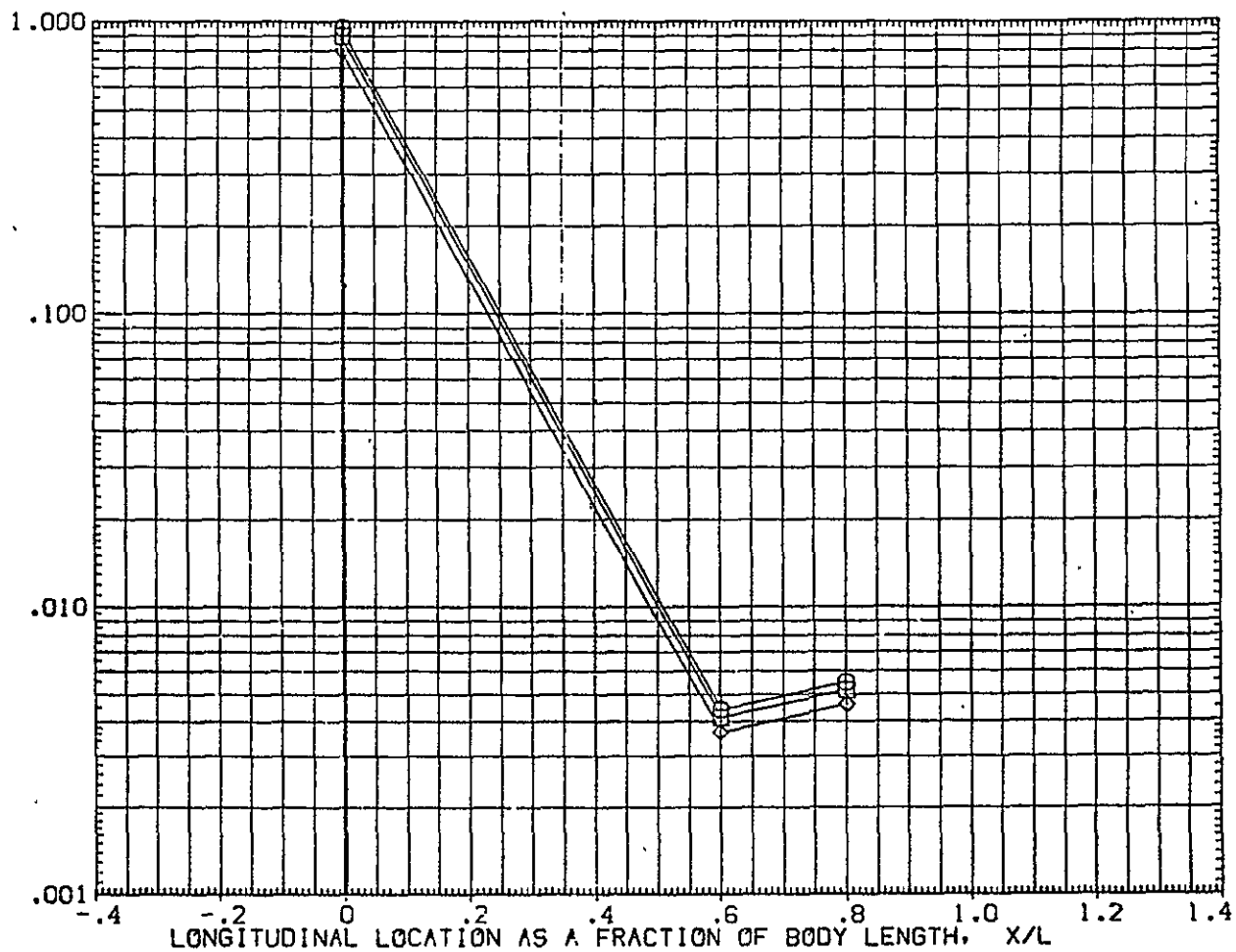


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/[H21] (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	.000	7.010	.000		
◇	.900					
	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

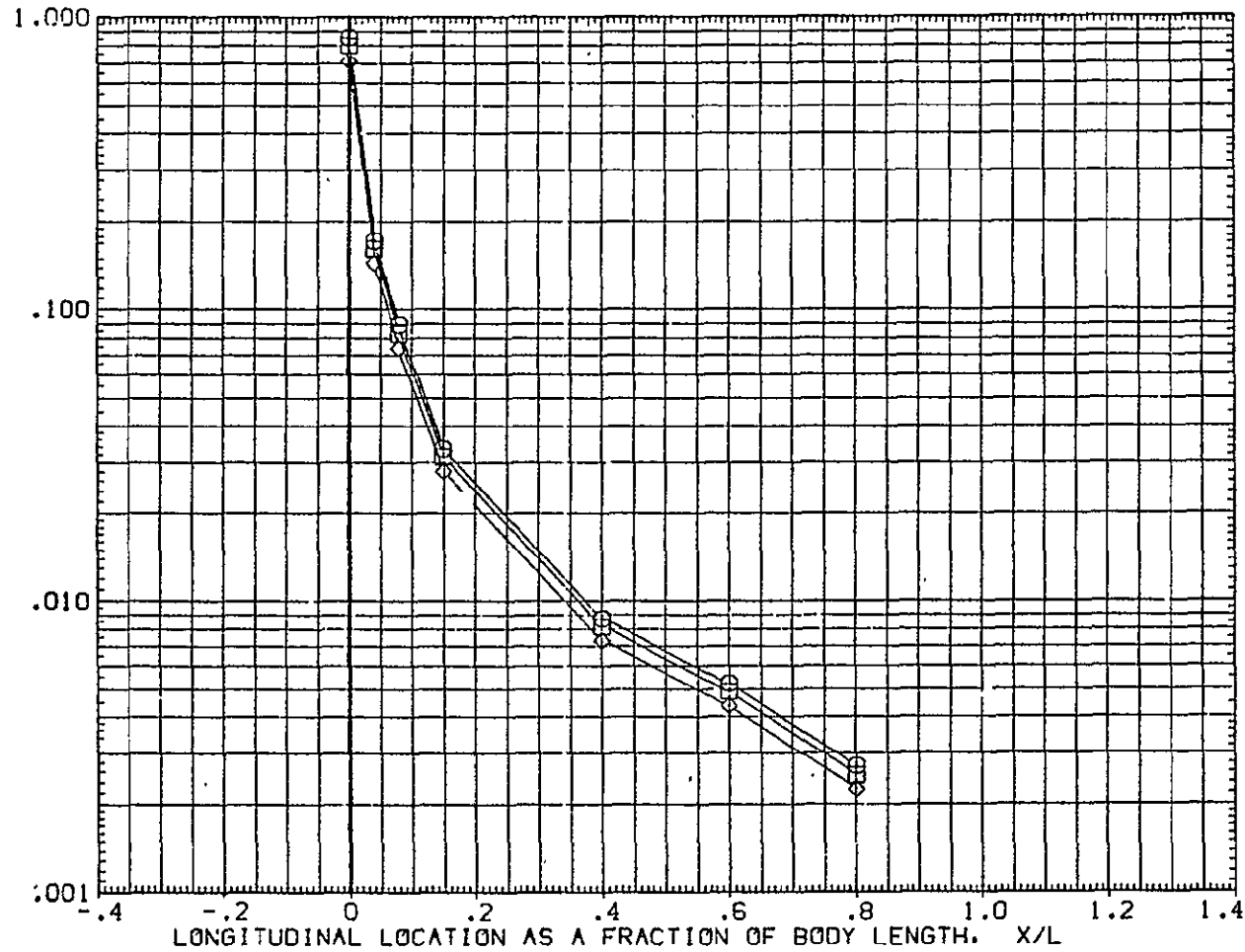


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

2

OH12/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
◇	.850	180.000	7.010	ALPHA	.000	BETA .000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

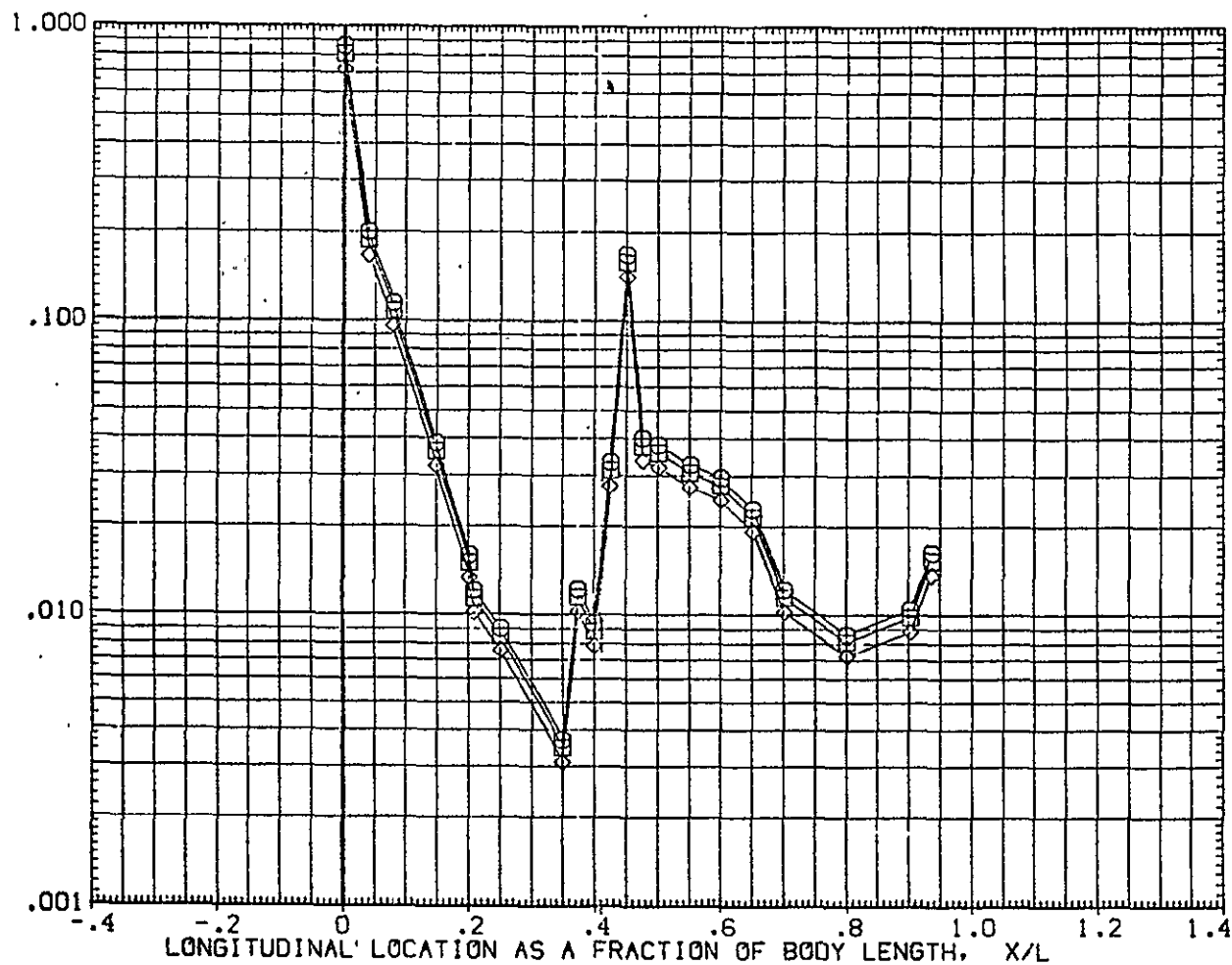


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	199.000	7.010	.000	.000	.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

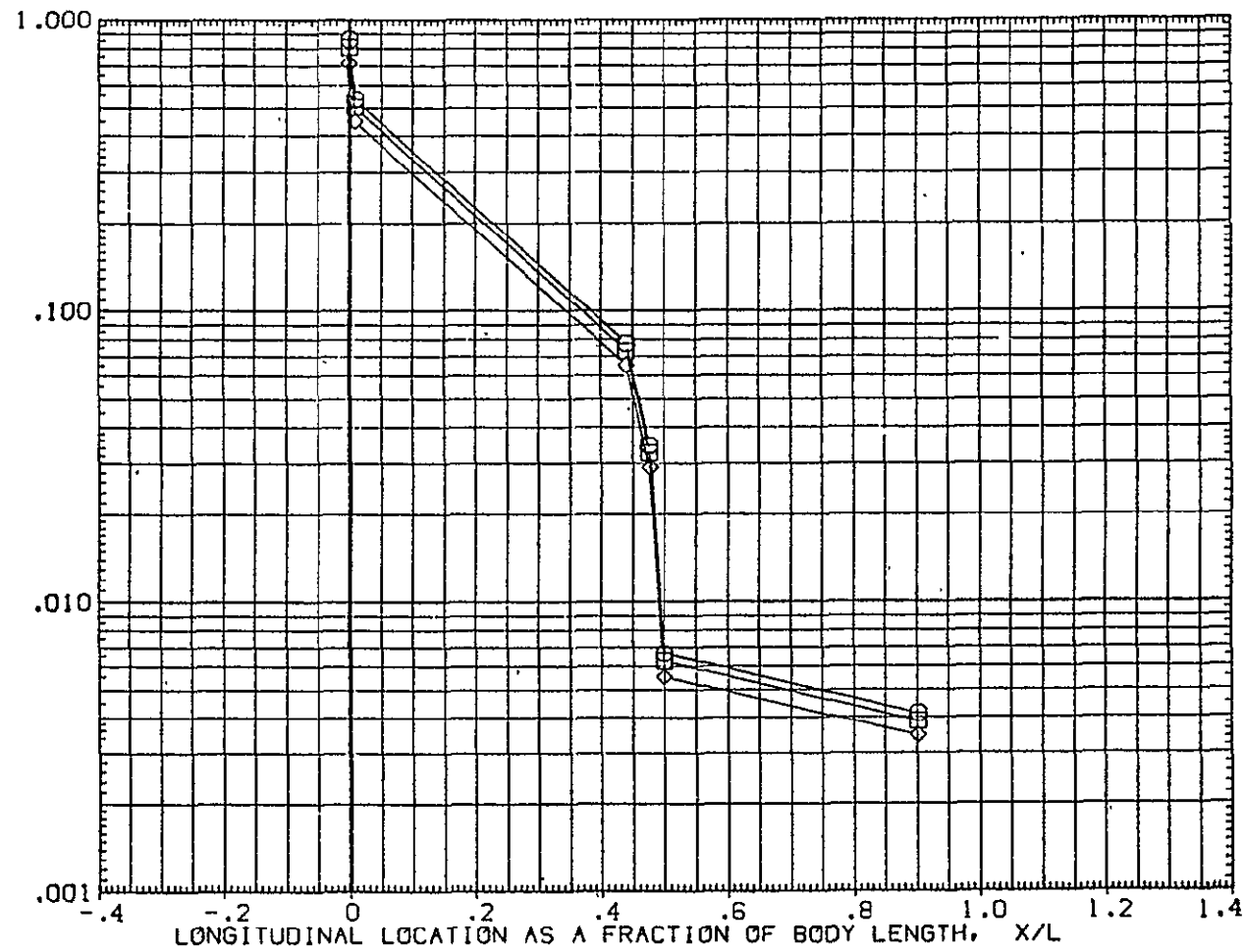


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/L_1 ALPHA = 0

CH12/1P21 (CAL HST 173-100) 37 C T TANK (RUGT05)

SYMBOL	HAW/WT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	221.000	7.010	.000	.000	.000
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

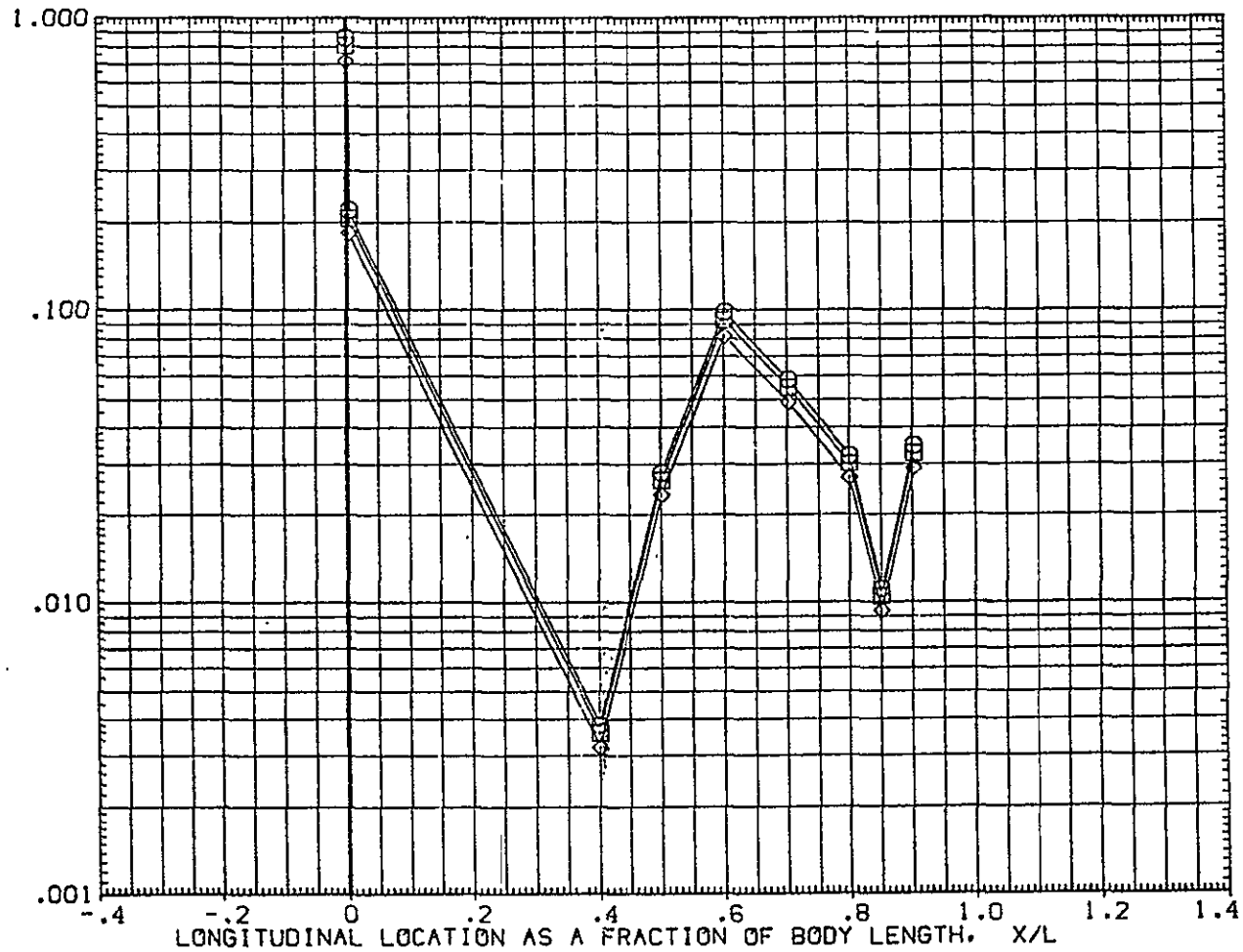


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES
◇	.850	241.000	7.010	ALPHA .000 BETA .000
□	.900			
○	1.000			

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

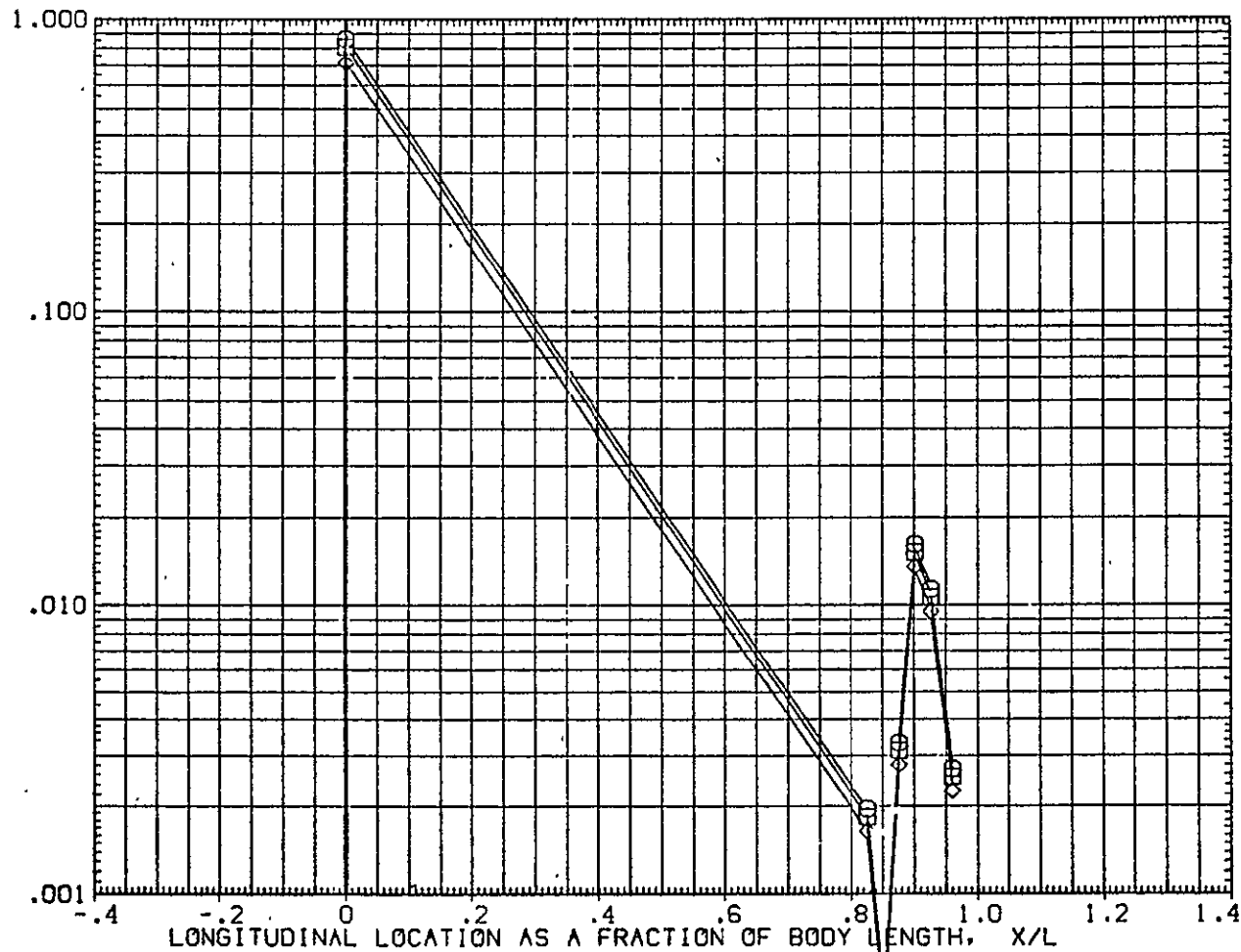


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/1H21 (CAL HST 173-100) 37 C T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	247.030	7.010	.000	.000	.000
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

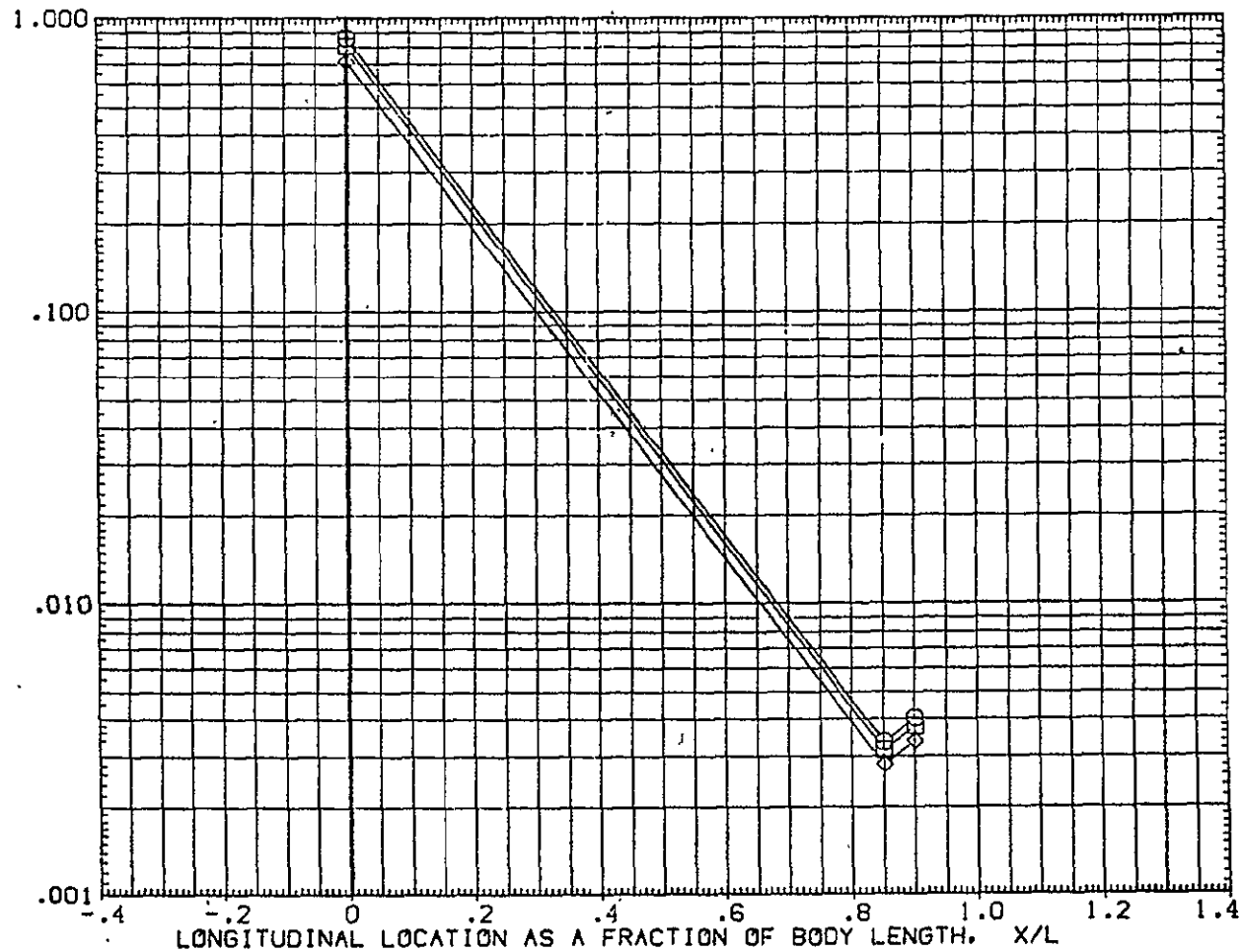


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 3" 0 T TANK (RUGT05)

SYMBOL	HAV/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	270.000	7.010	ALPHA	.000	BETA
□	.900					.000
◇	1.000					

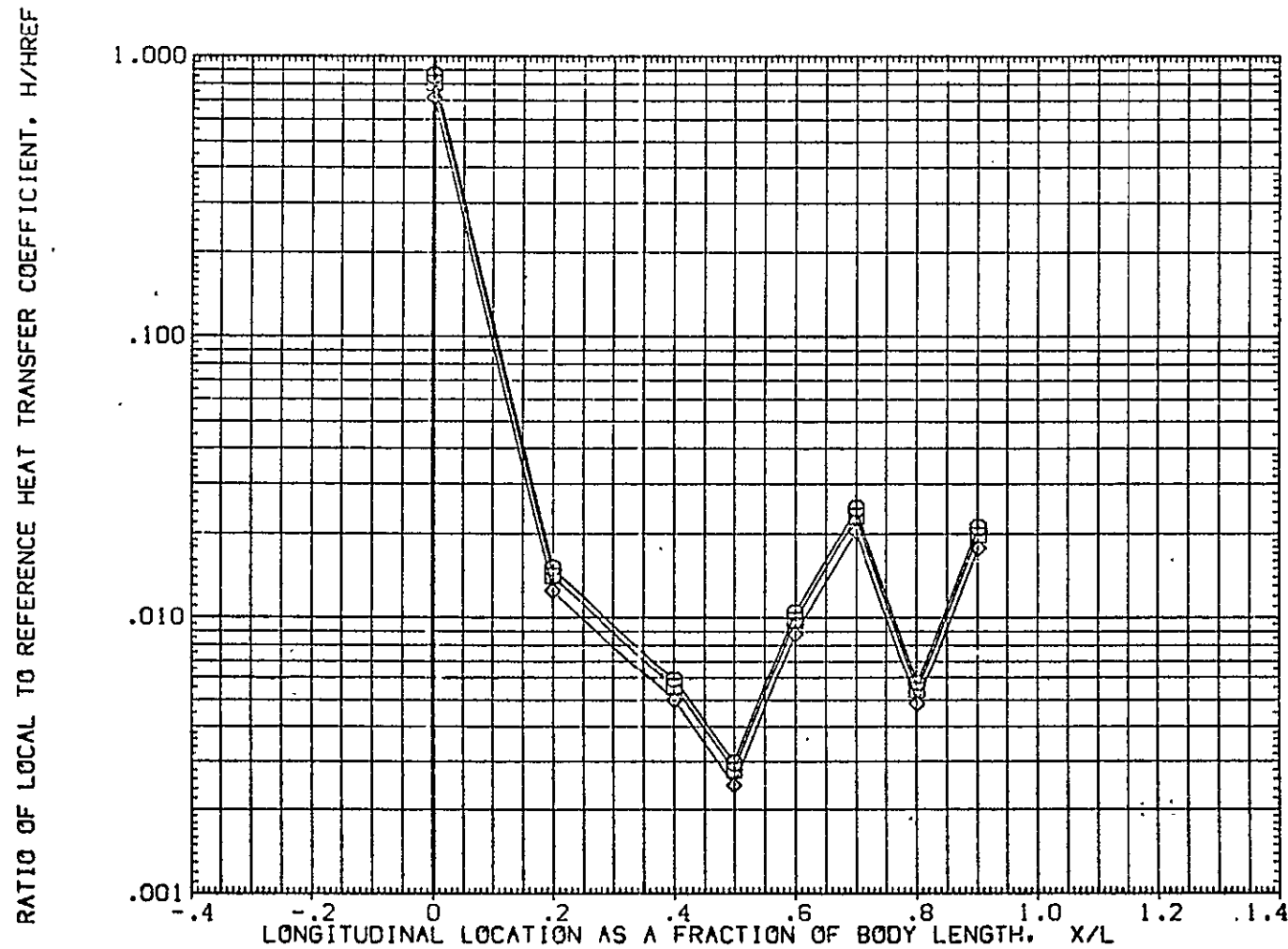


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

CH12/IH21 (CAL HST 173-100) 37 G T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	
◇	.850	315.000	7.010		.000		.000
□	.900						
○	1.000						

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

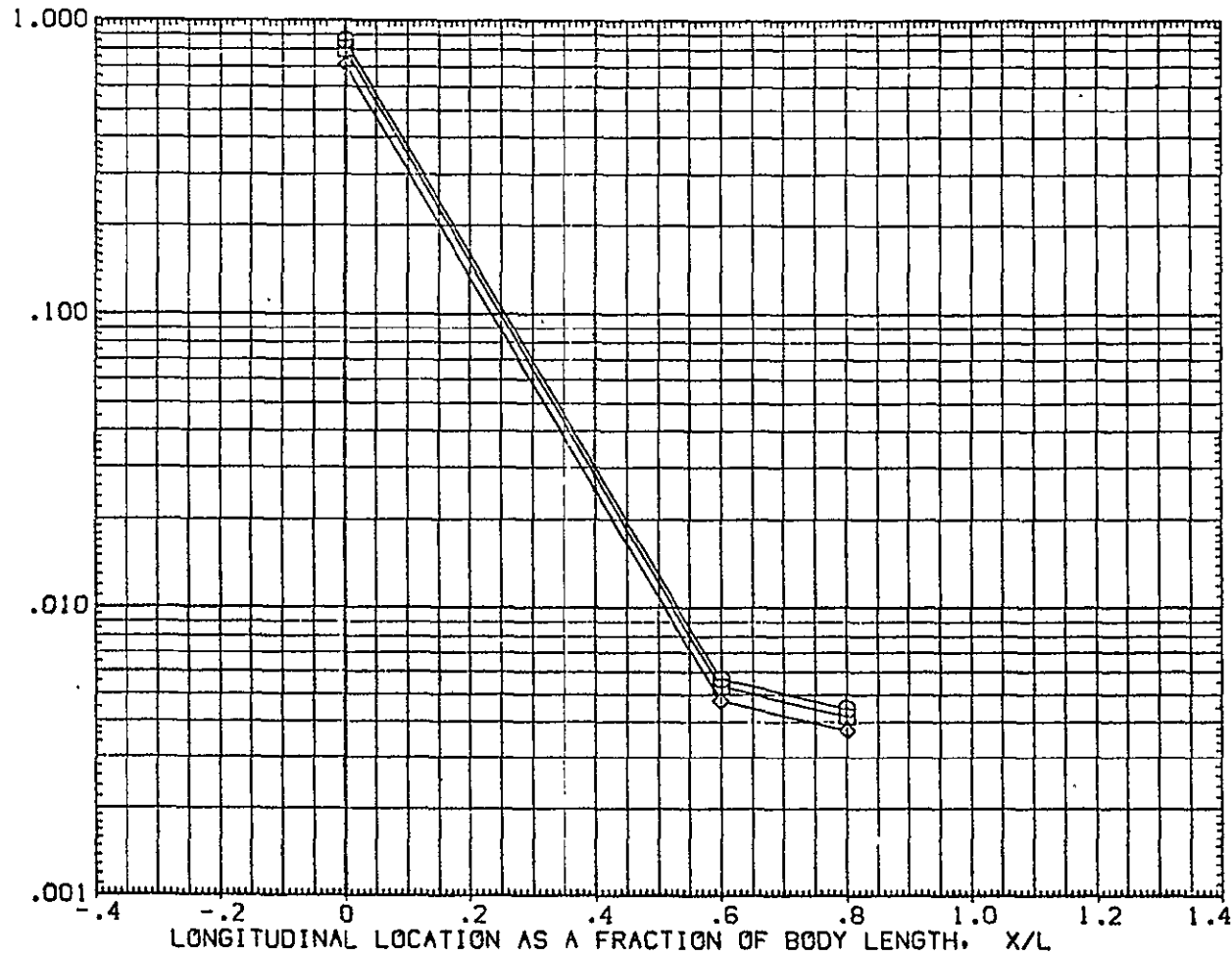


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ $\alpha = 0$

OH12/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	.000	7.617	ALPHA	.000	BETA
□	.900					.000
◇	1.000					

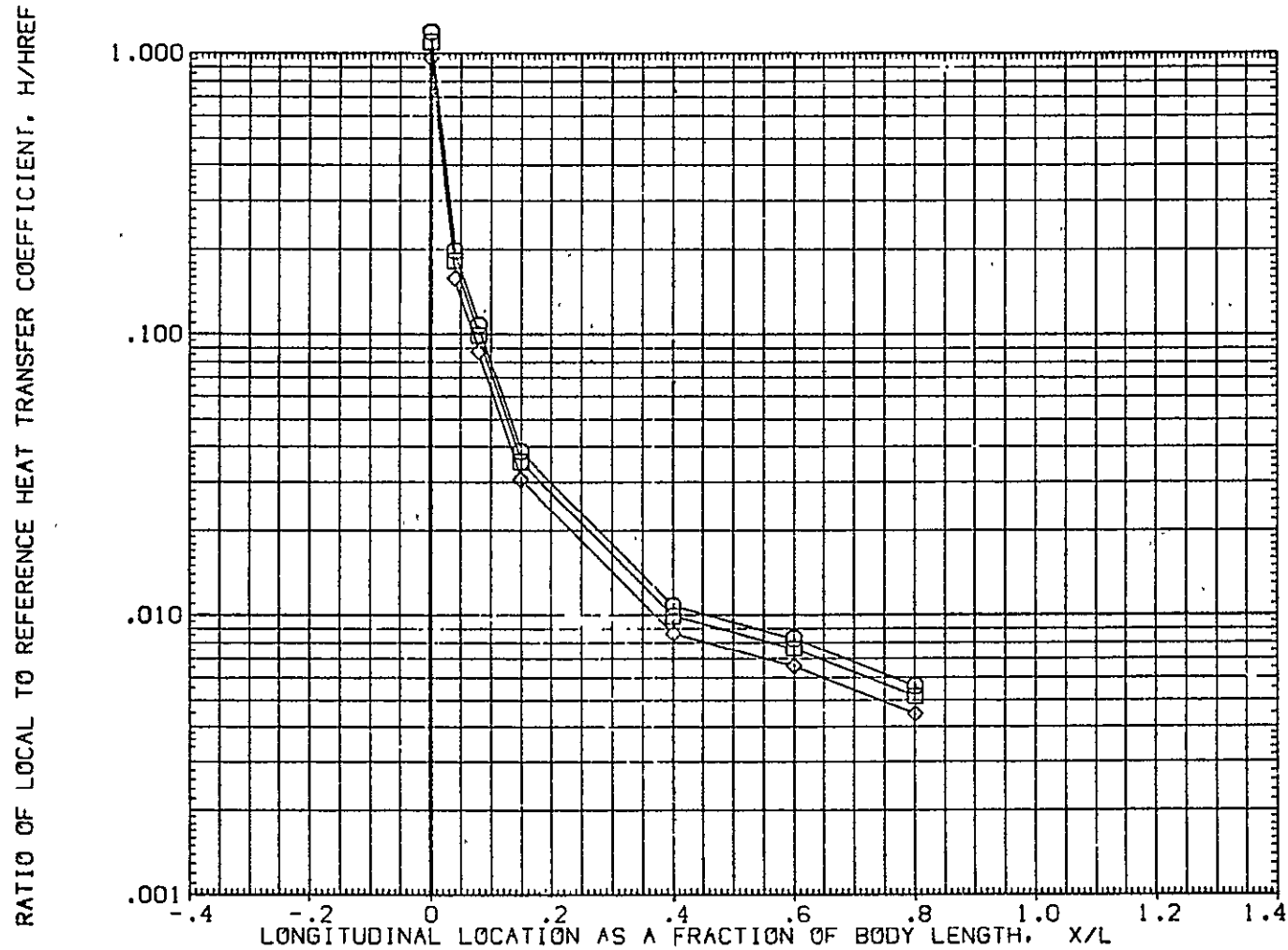
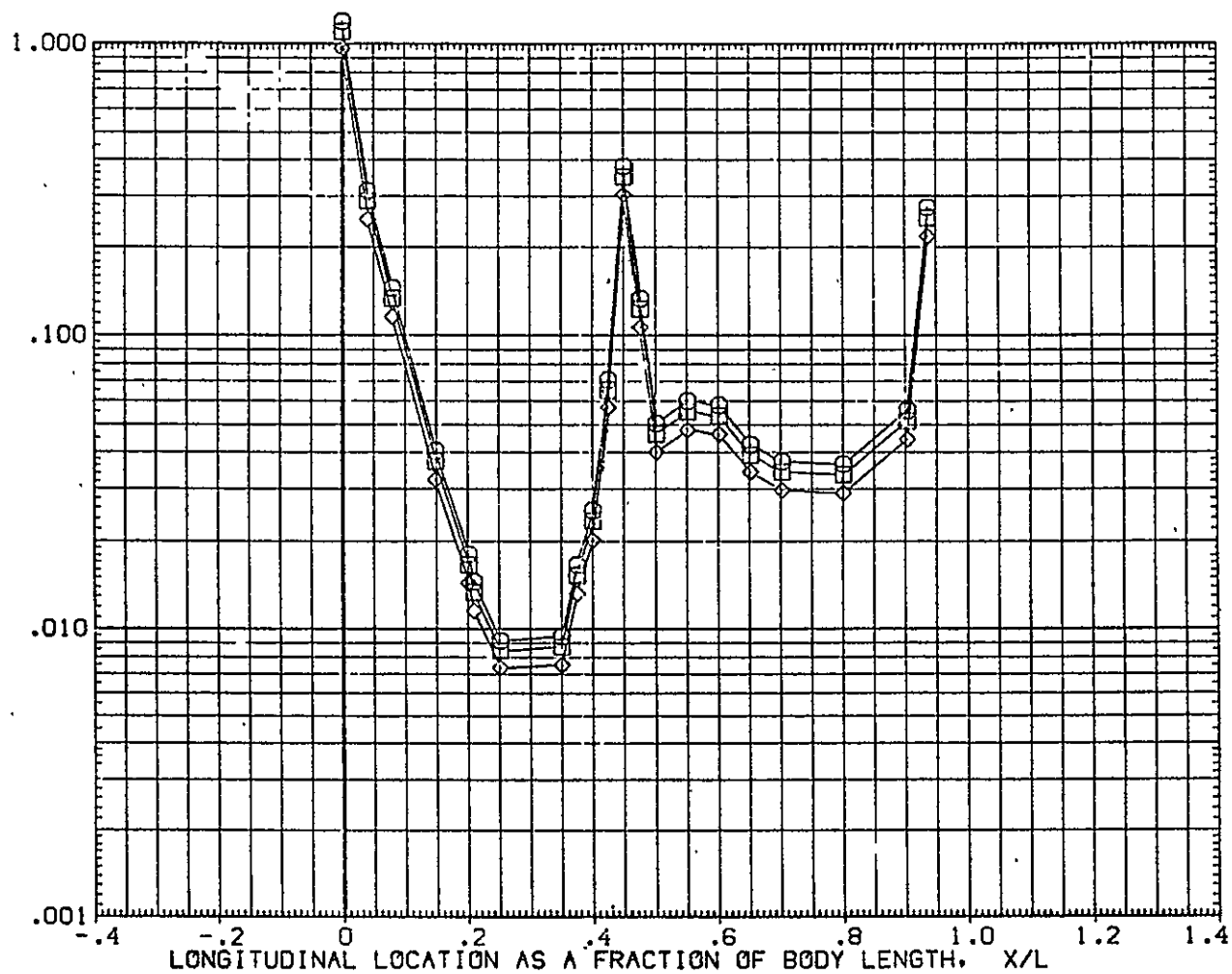


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	180.000	7.617	.000		.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.850	199.000	7.617		.000	BETA
□	.900					.000
◇	1.000					

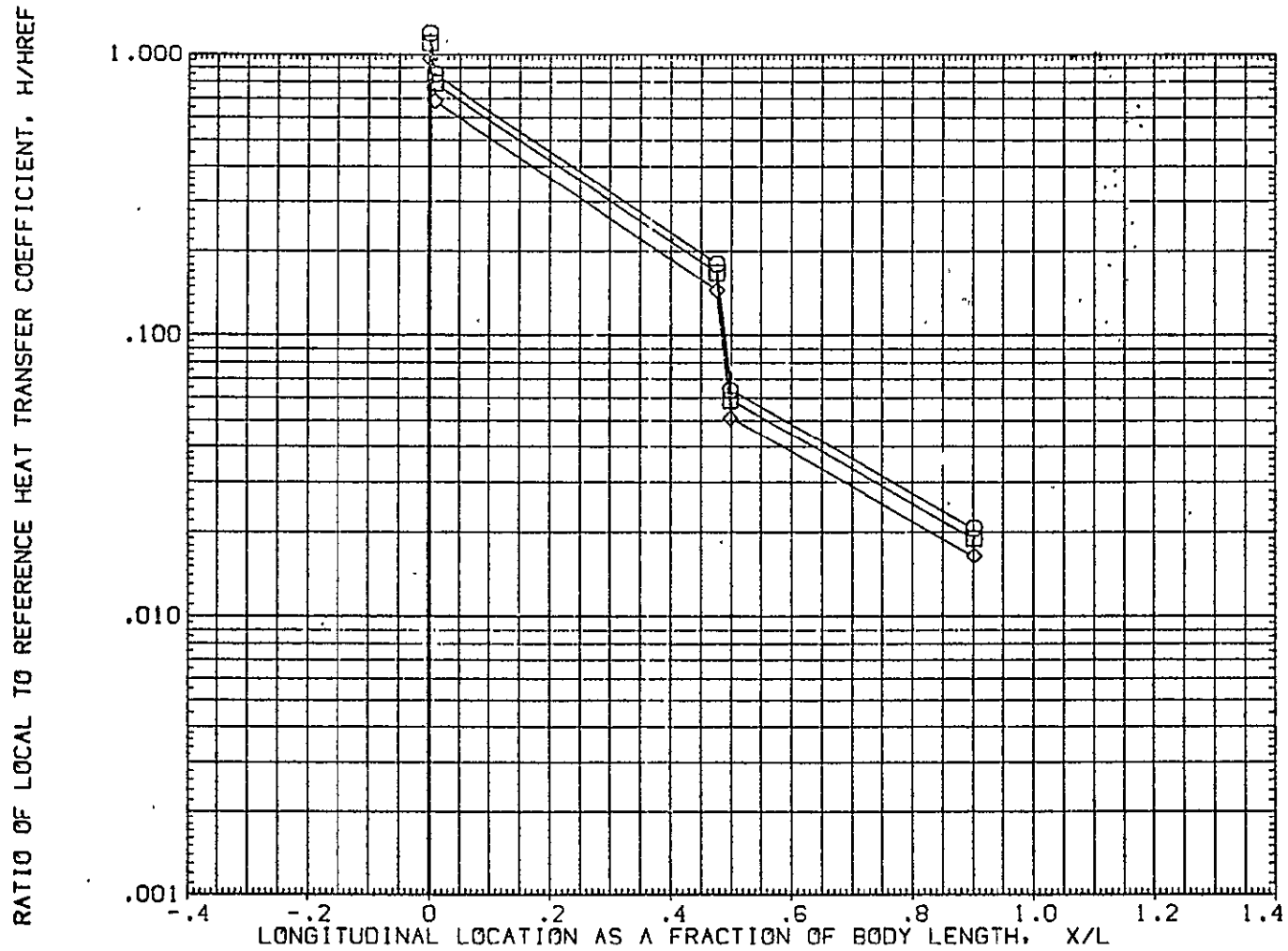


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES		BETA	
○	.850	221.000	7.617		.00°			.000
□	.900							
◇	1.000							

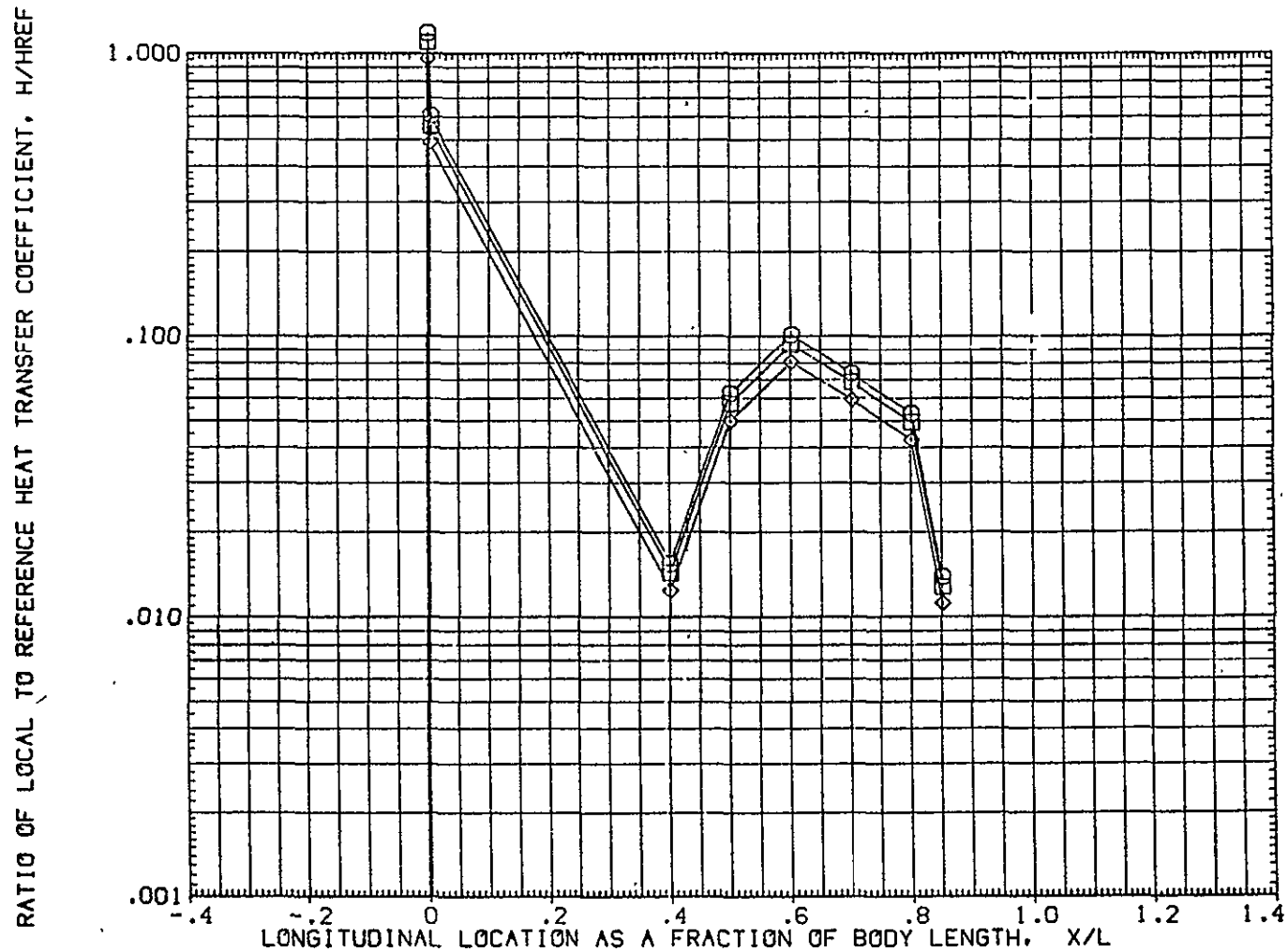


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	241.000	7.617	.000	.000	.000
◇	.900					
◇	1.000					

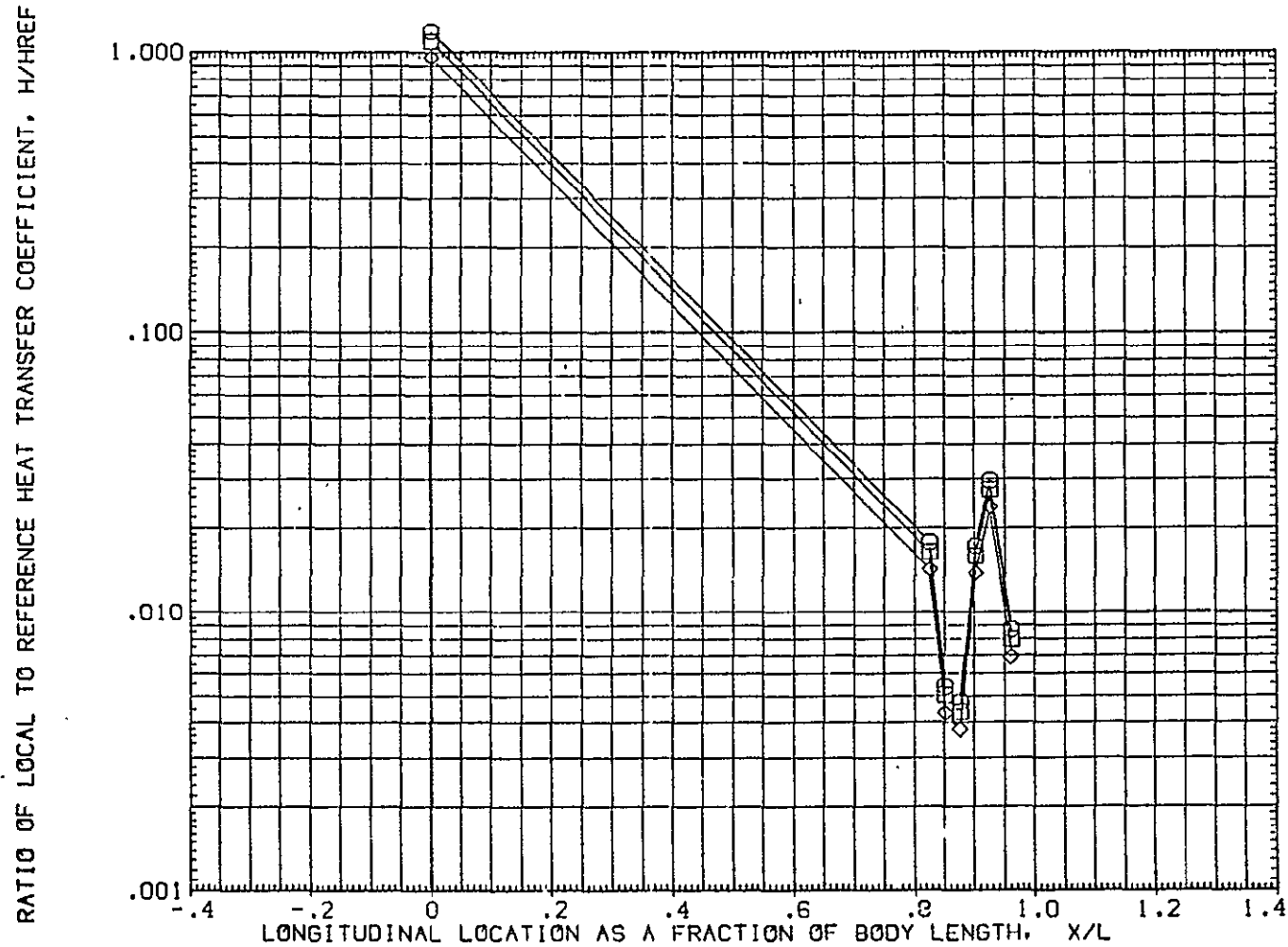


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/1421 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	MAN/HT	PHI	PACH	ALPHA	PARAMETRIC VALUES	
◇ □ ○	.850	247.000	7.617	.000	BETA	.000
◇ □ ○	.900					
◇ □ ○	1.000					

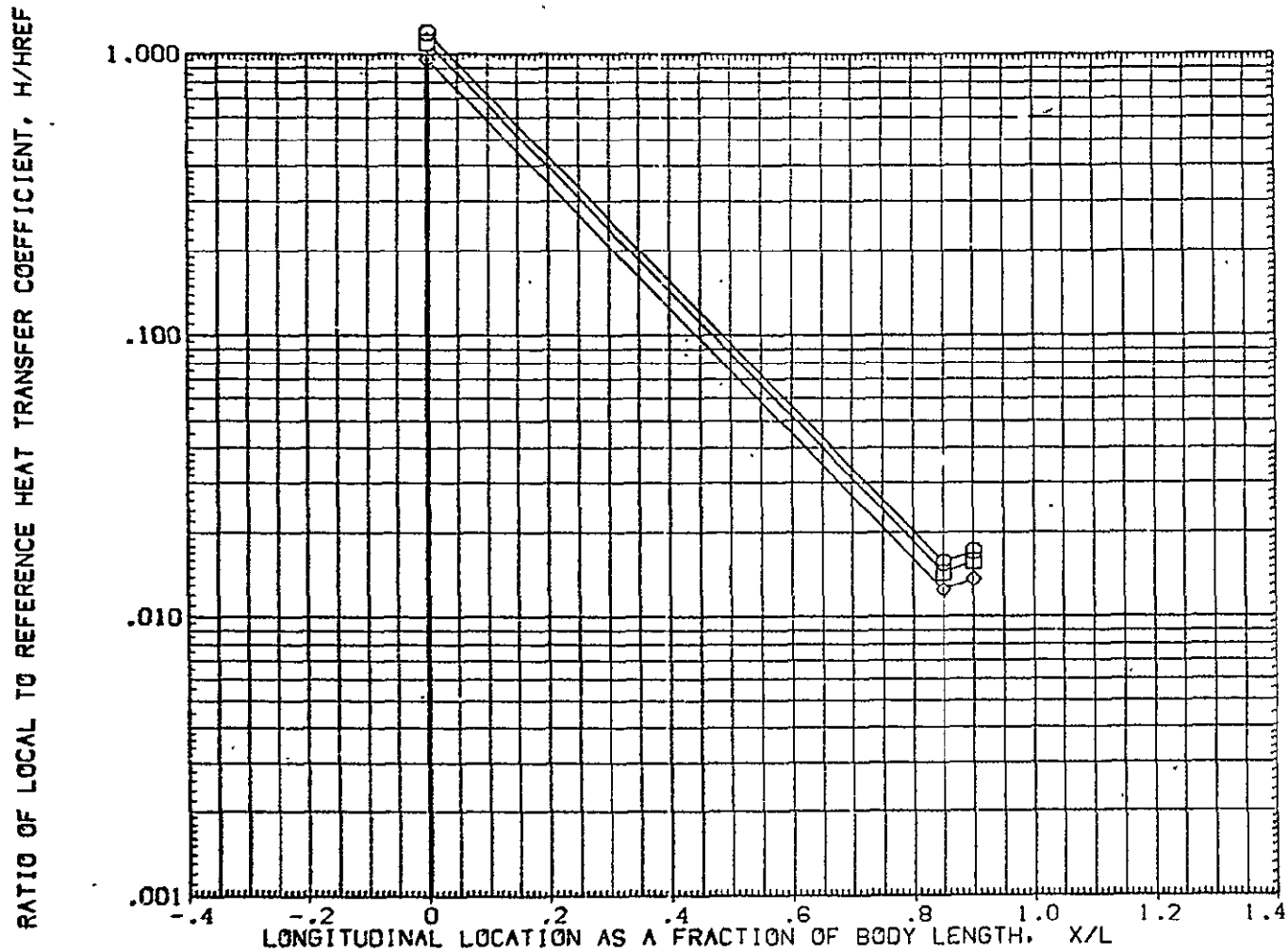


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ $\alpha = 0$

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

OH12/11121 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	270.000	7.617	.000	.000	.000
□	.900					
◇	1.000					

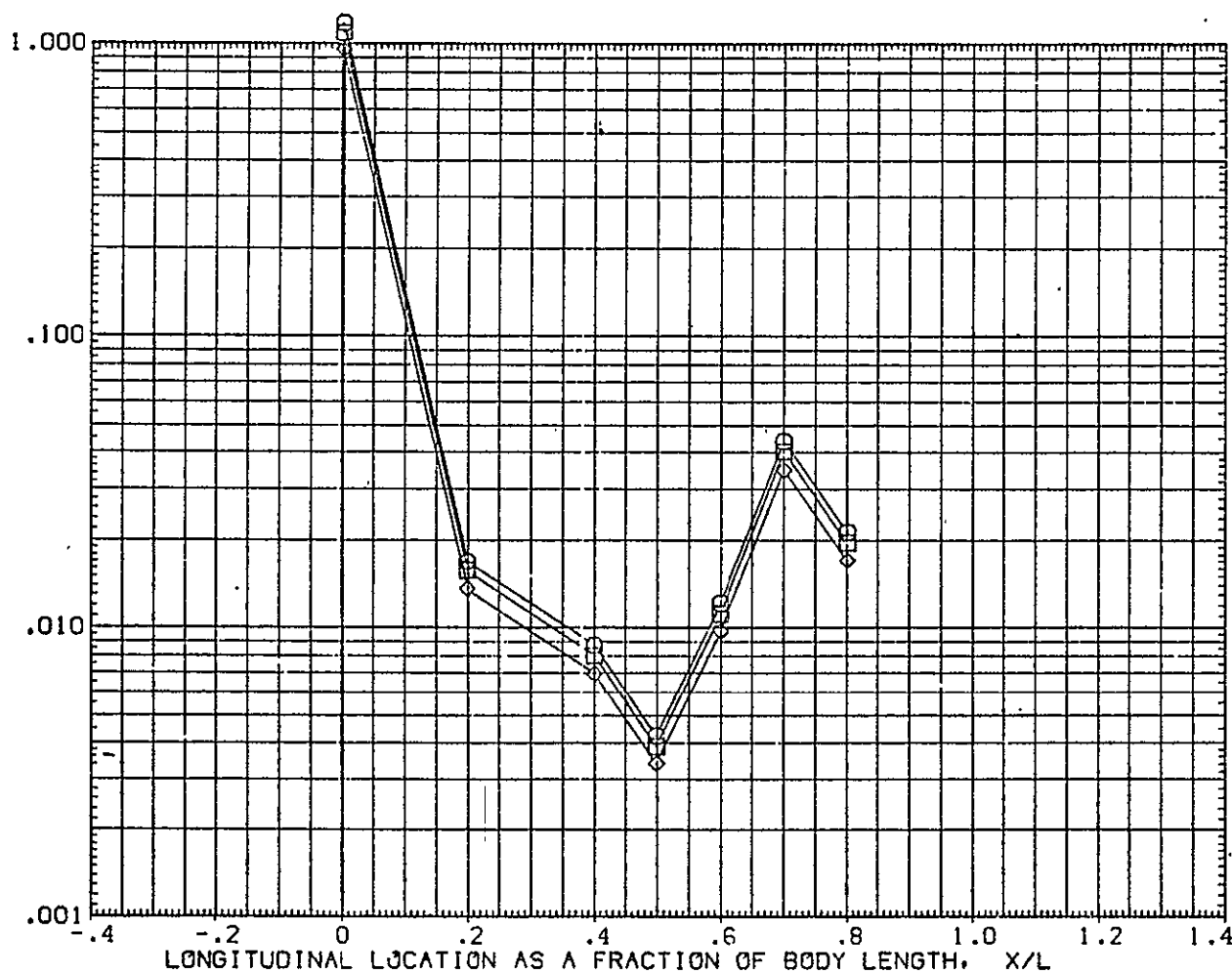


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	315.000	7.617	ALPHA	.000	BETA
□	.900					.000
◇	1.000					

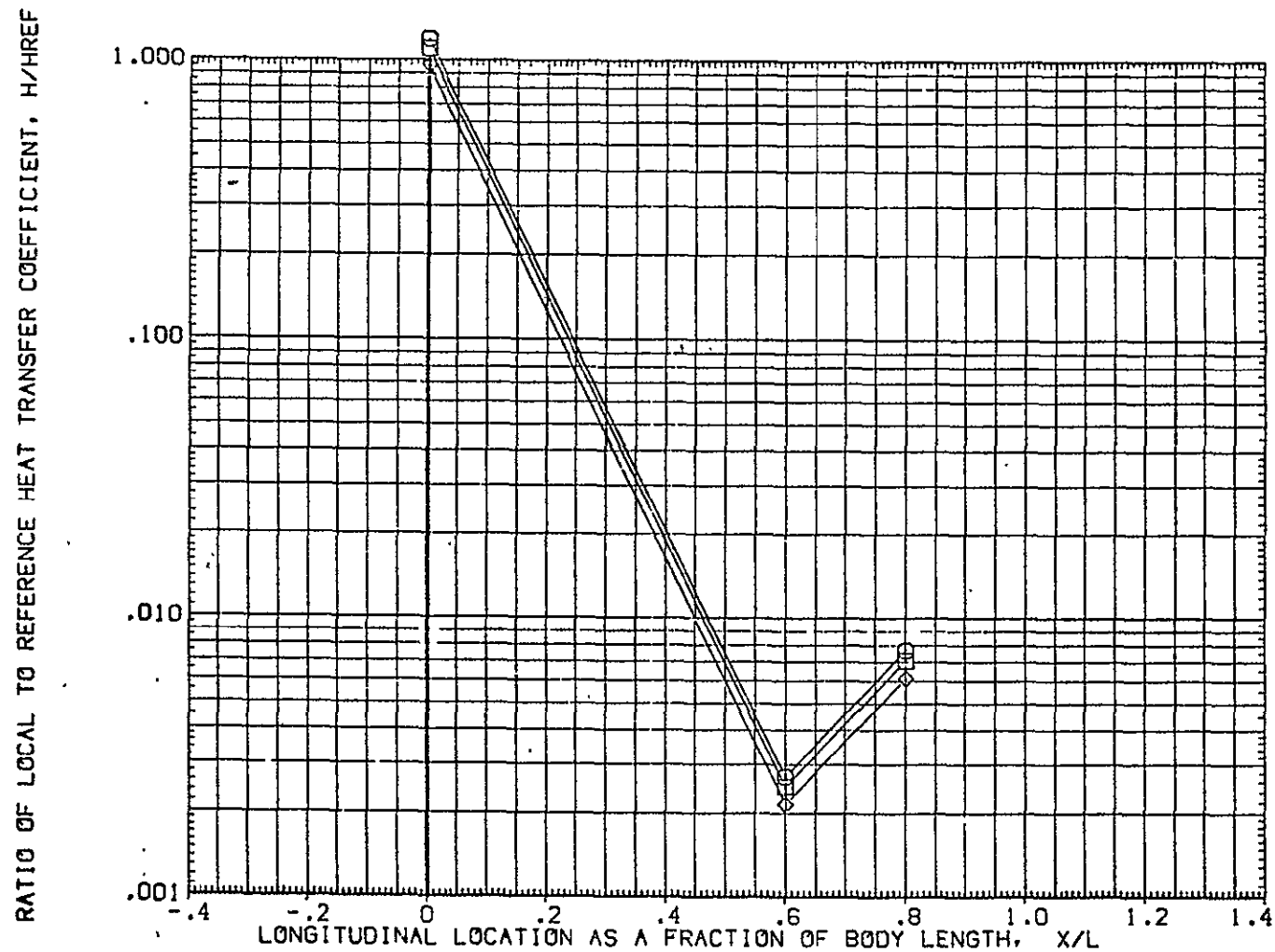


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	.000	18.170			
◇	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

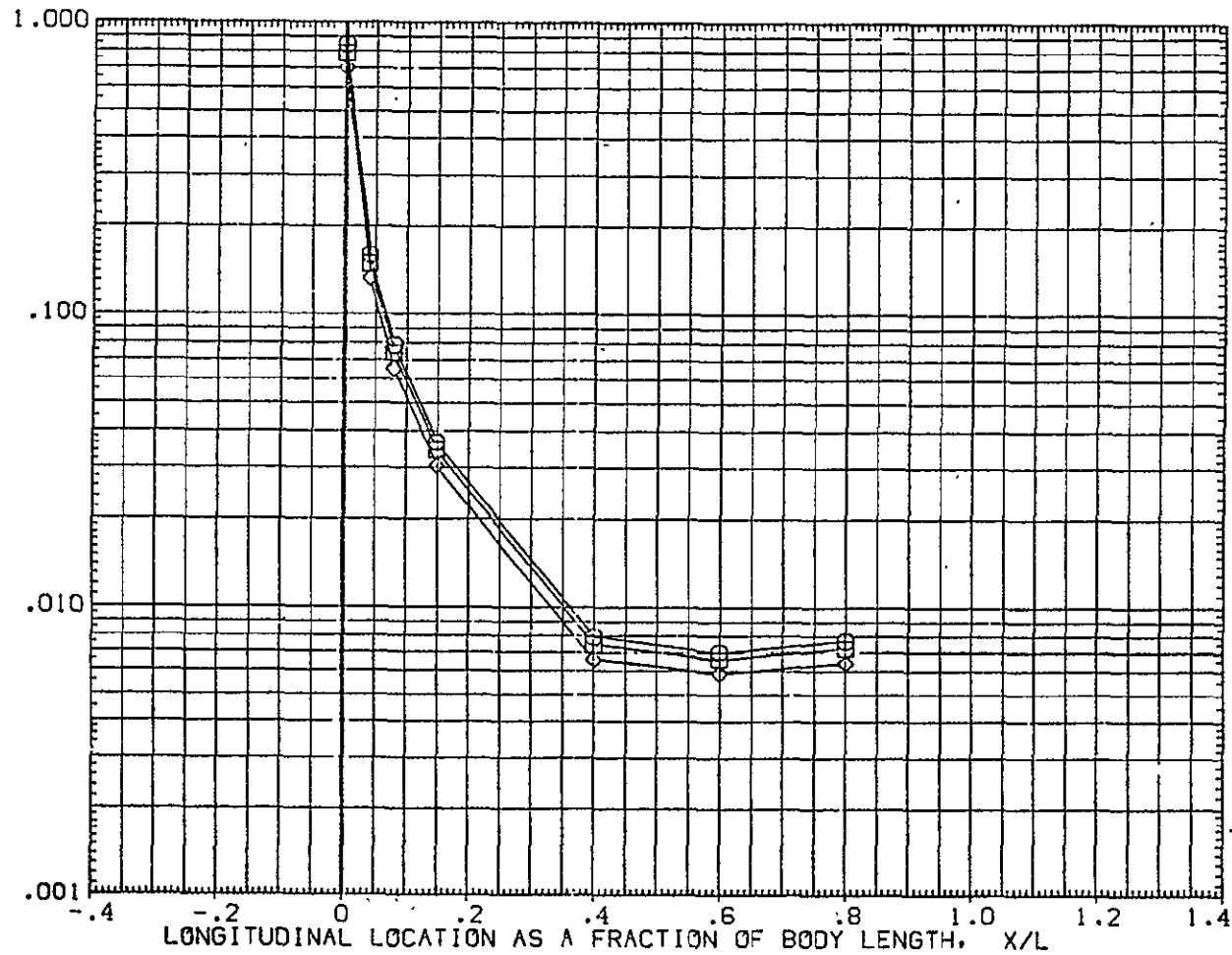


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	180.000	18.170	ALPHA	.000	BETA
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

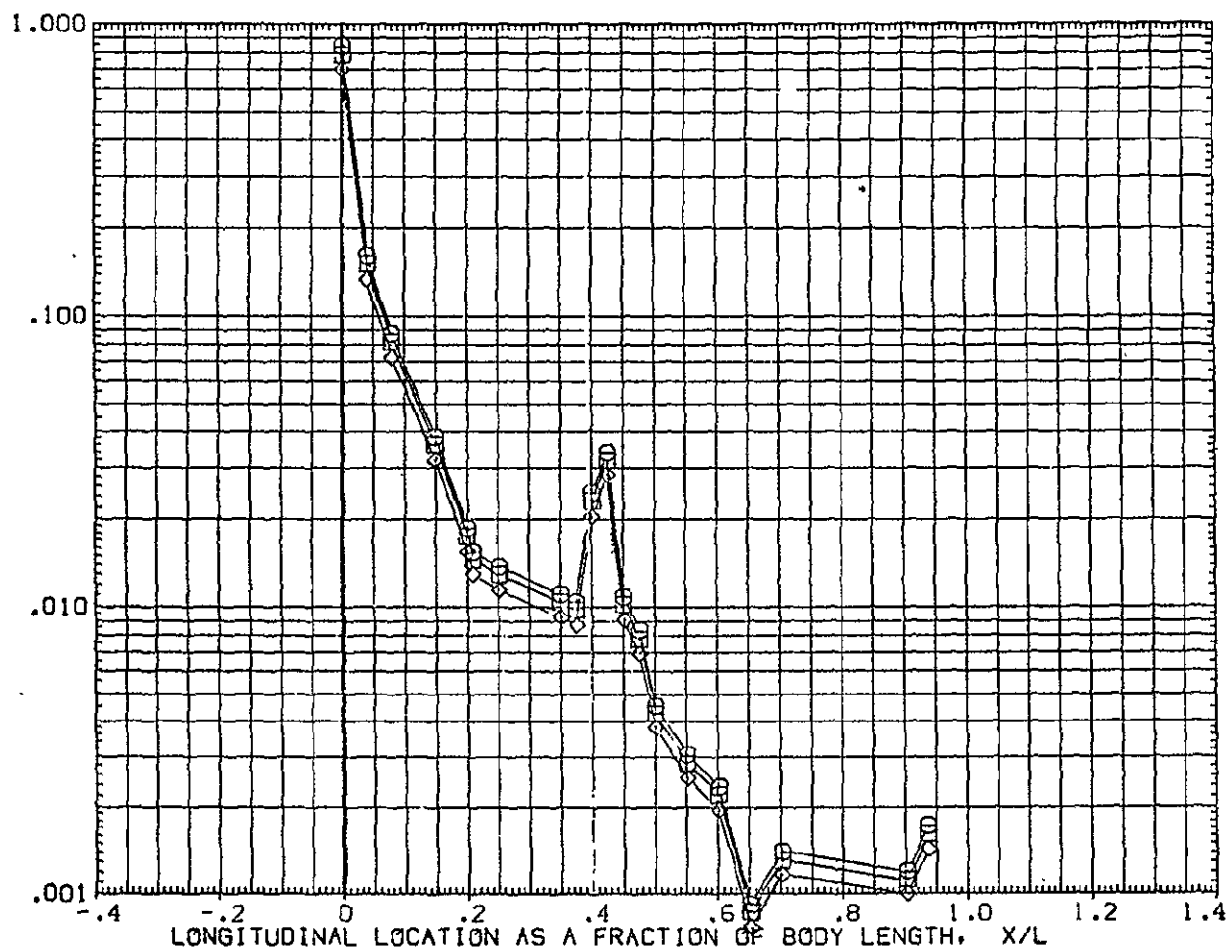


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	199.000	18.170	.000	.000	.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

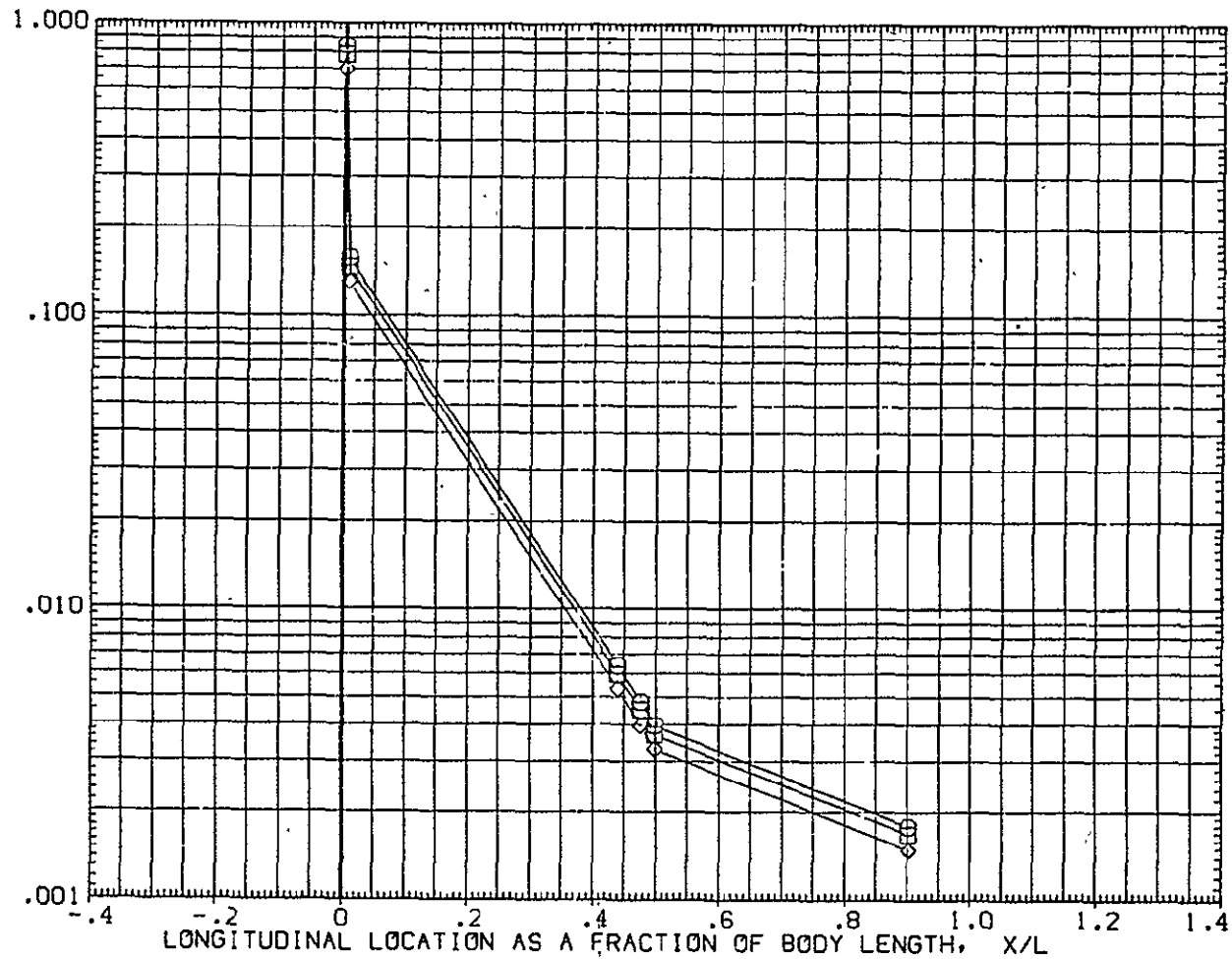
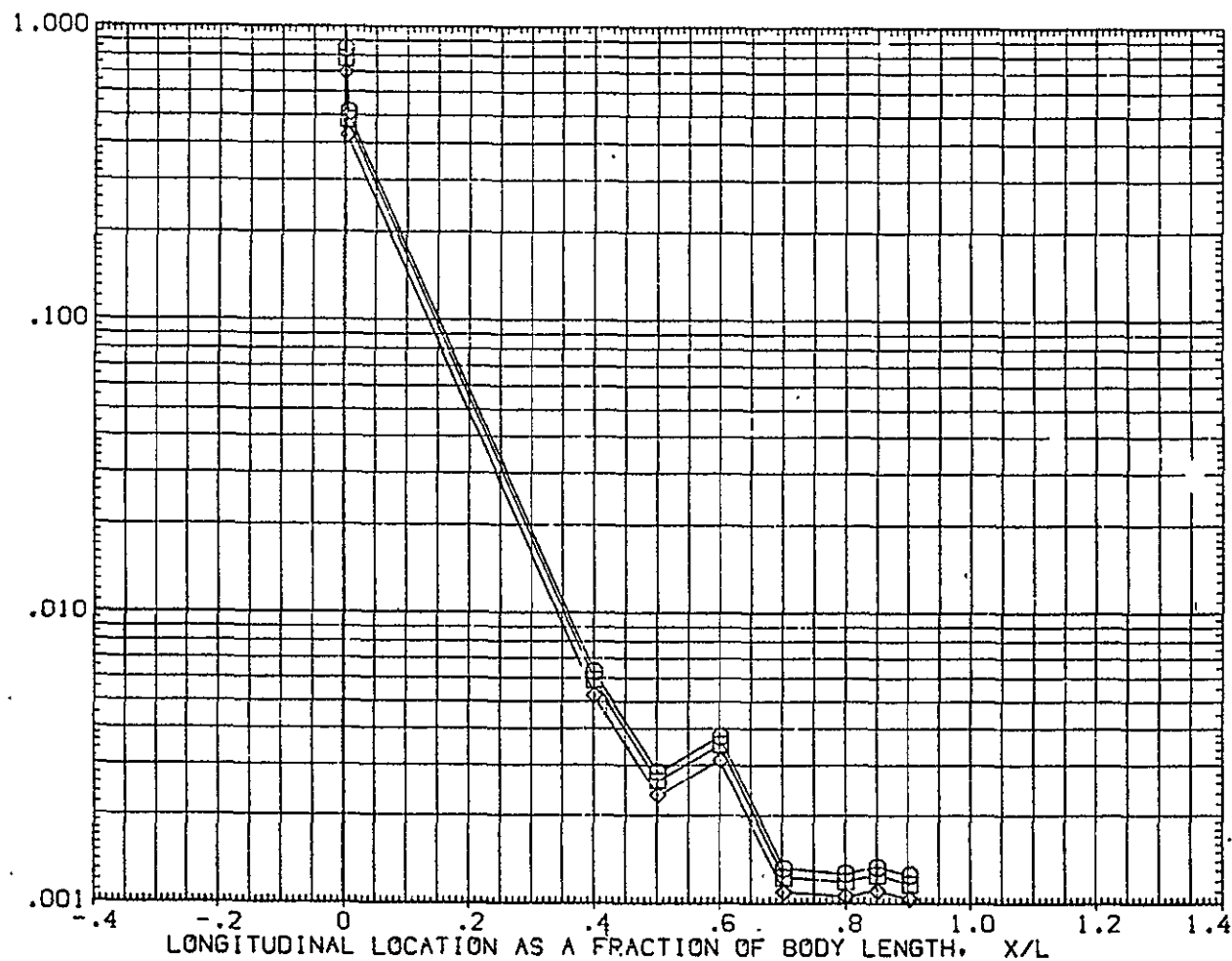


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ $\alpha = 0$

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	221.000	18.170	.000	.000	.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	VALUES
○	.850	241.000	18.170	.000			.000
□	.900						
◇	1.000						

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

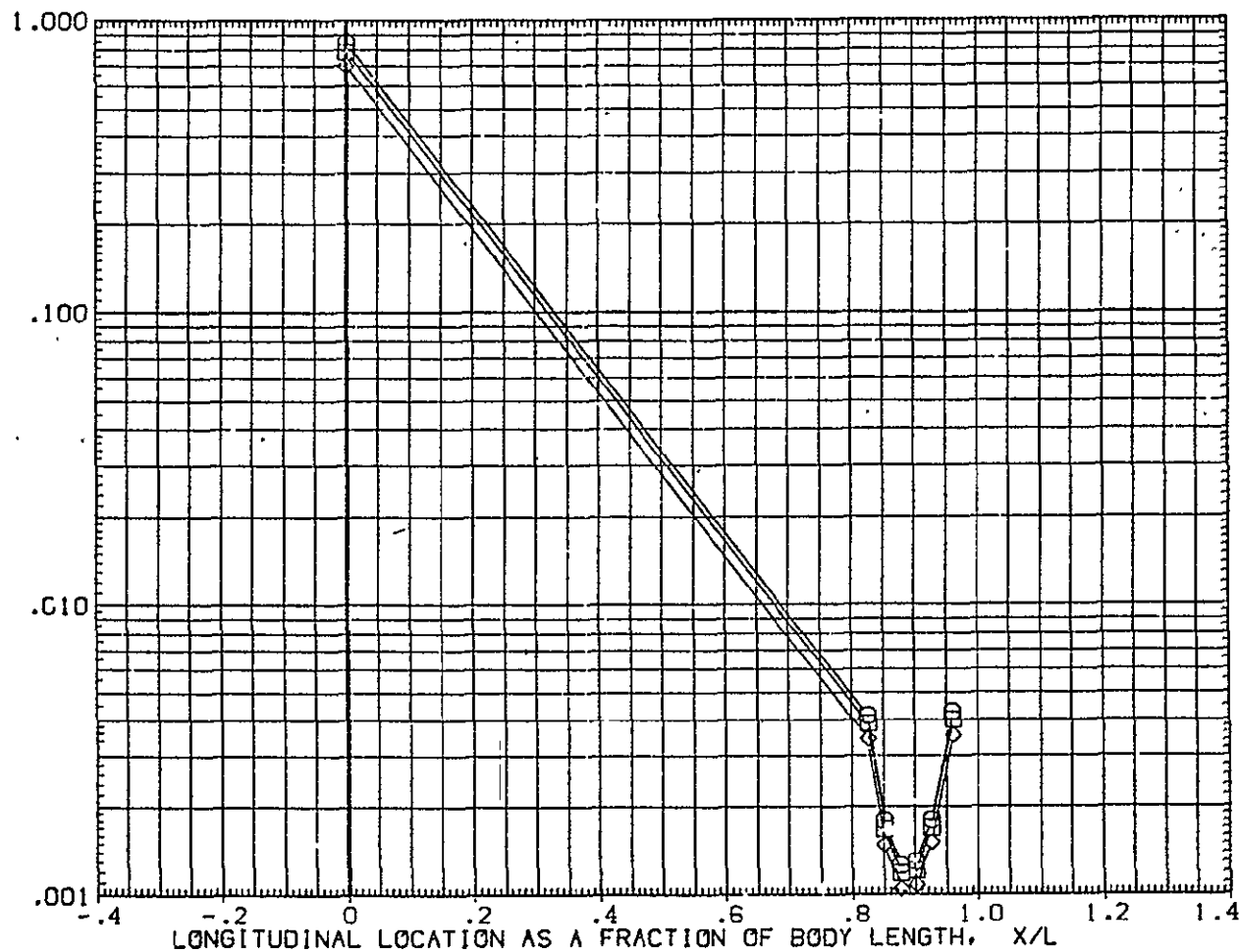


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0412/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	247.000	18.170	ALPHA	.000	BETA
□	.900					.000
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

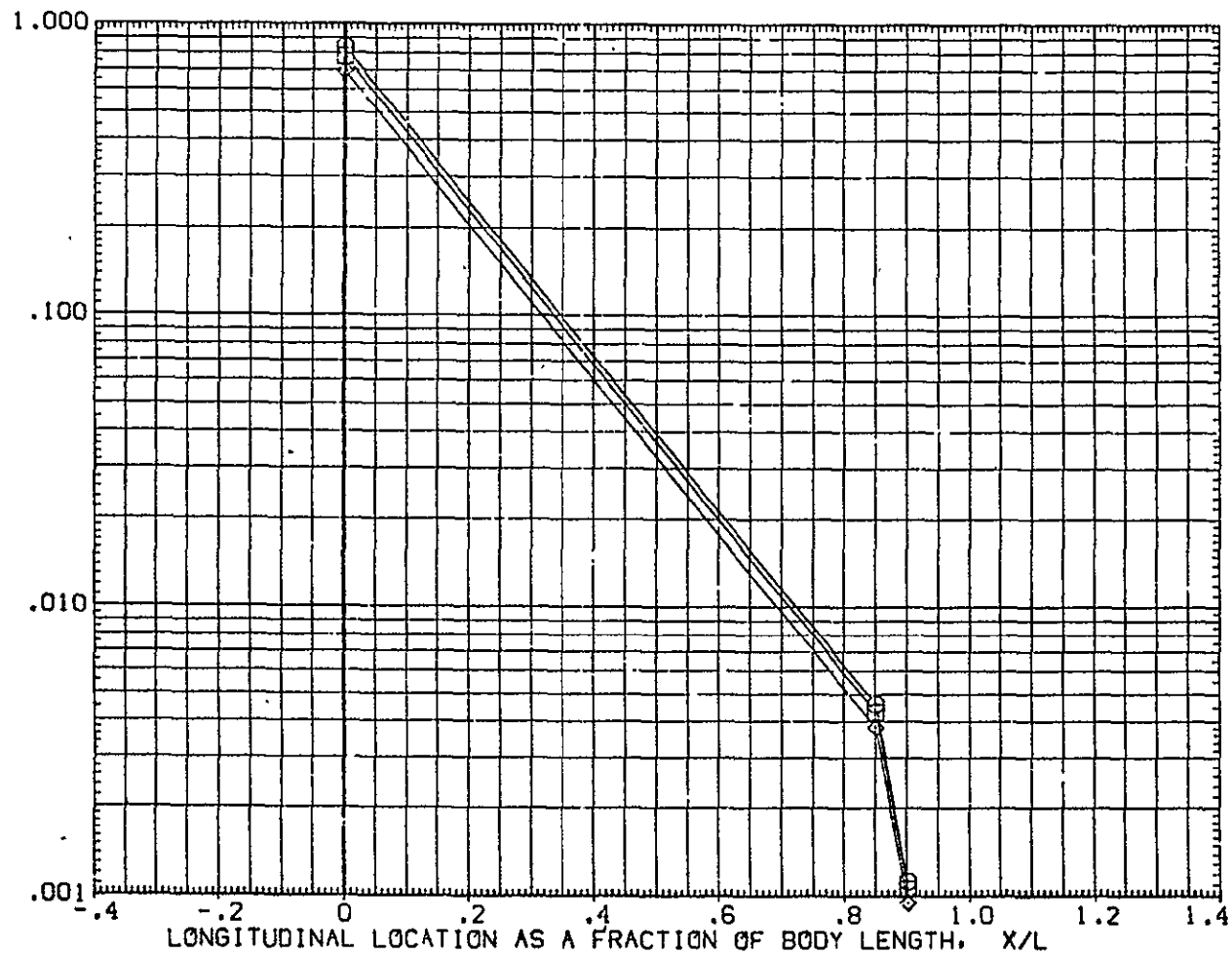


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ $\alpha = 0$

OH12/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
□	.850	270.000	18.170	.000	BETA	.000
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

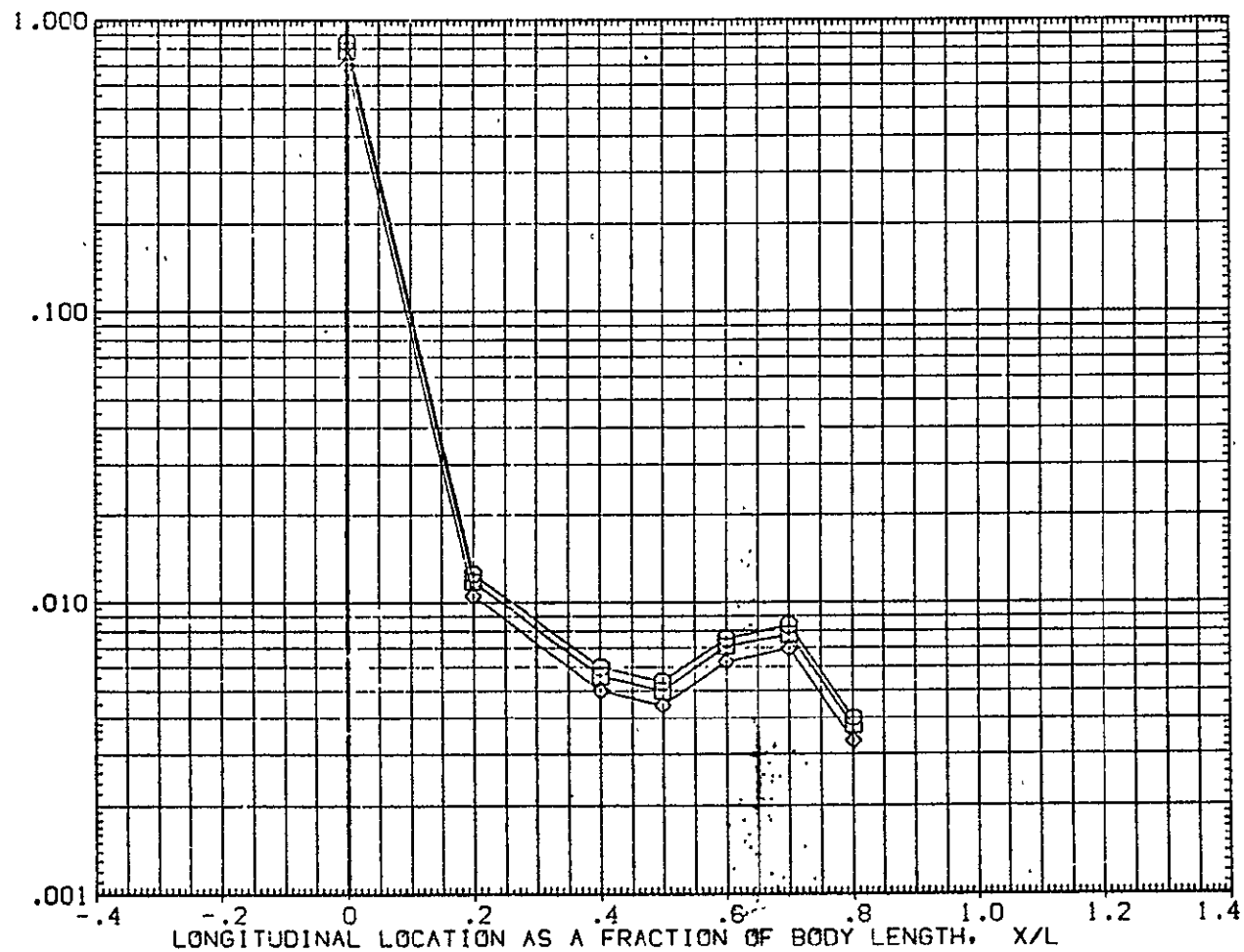


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
◇	.850	315.000	18.170	ALPHA	.000	BETA
□	.900					.000
○	1.000					

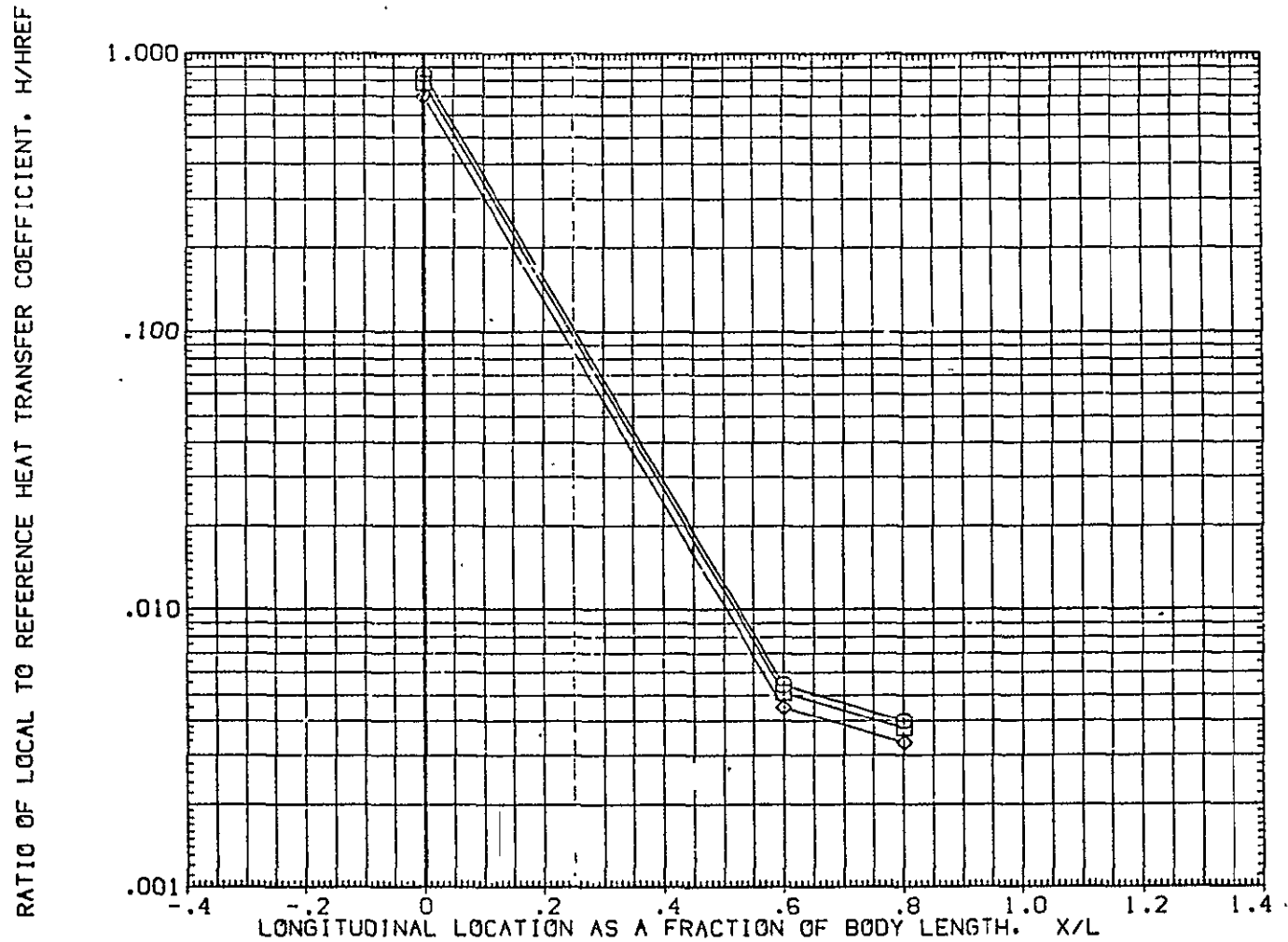


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.950	.000	18.950			
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

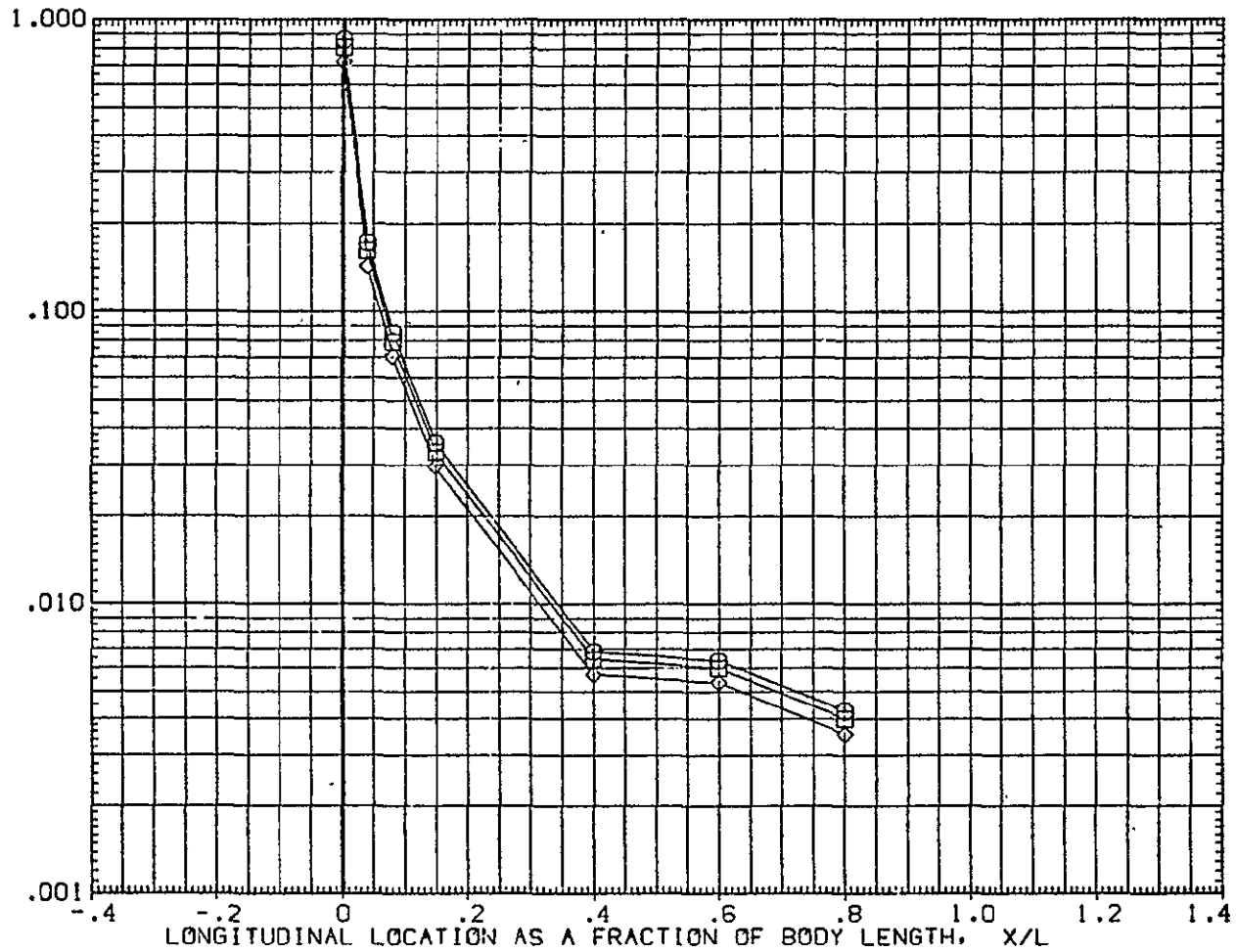


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/L ALPHA = 0

GH12/IH21 (CAL HST I73-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	180.000	18.950	.000	.000	.000
□	.900					
◇	1.000					

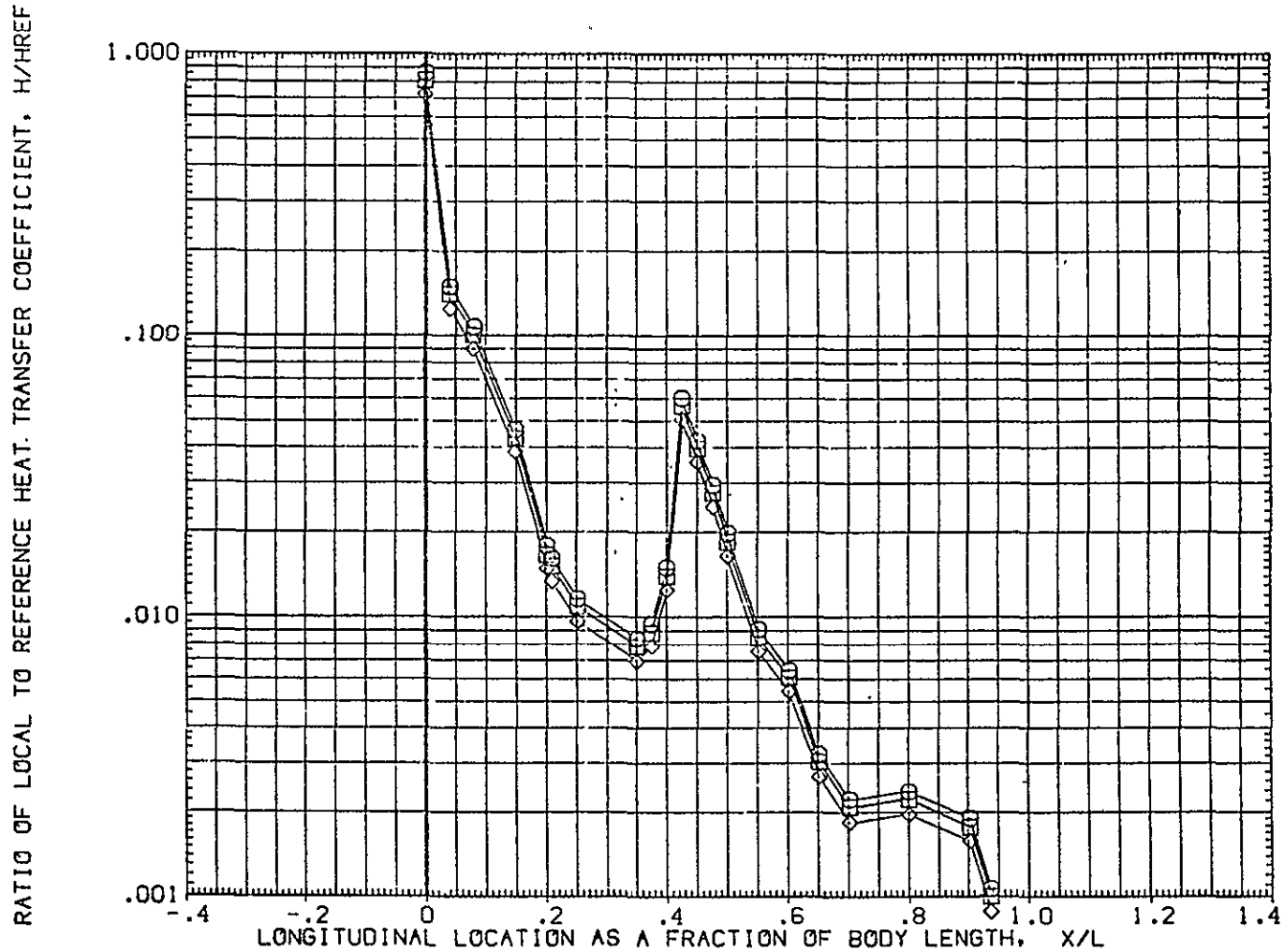


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12/IH21 (CAL HST I73-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	199.000	18.950	.000	.000	.000
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

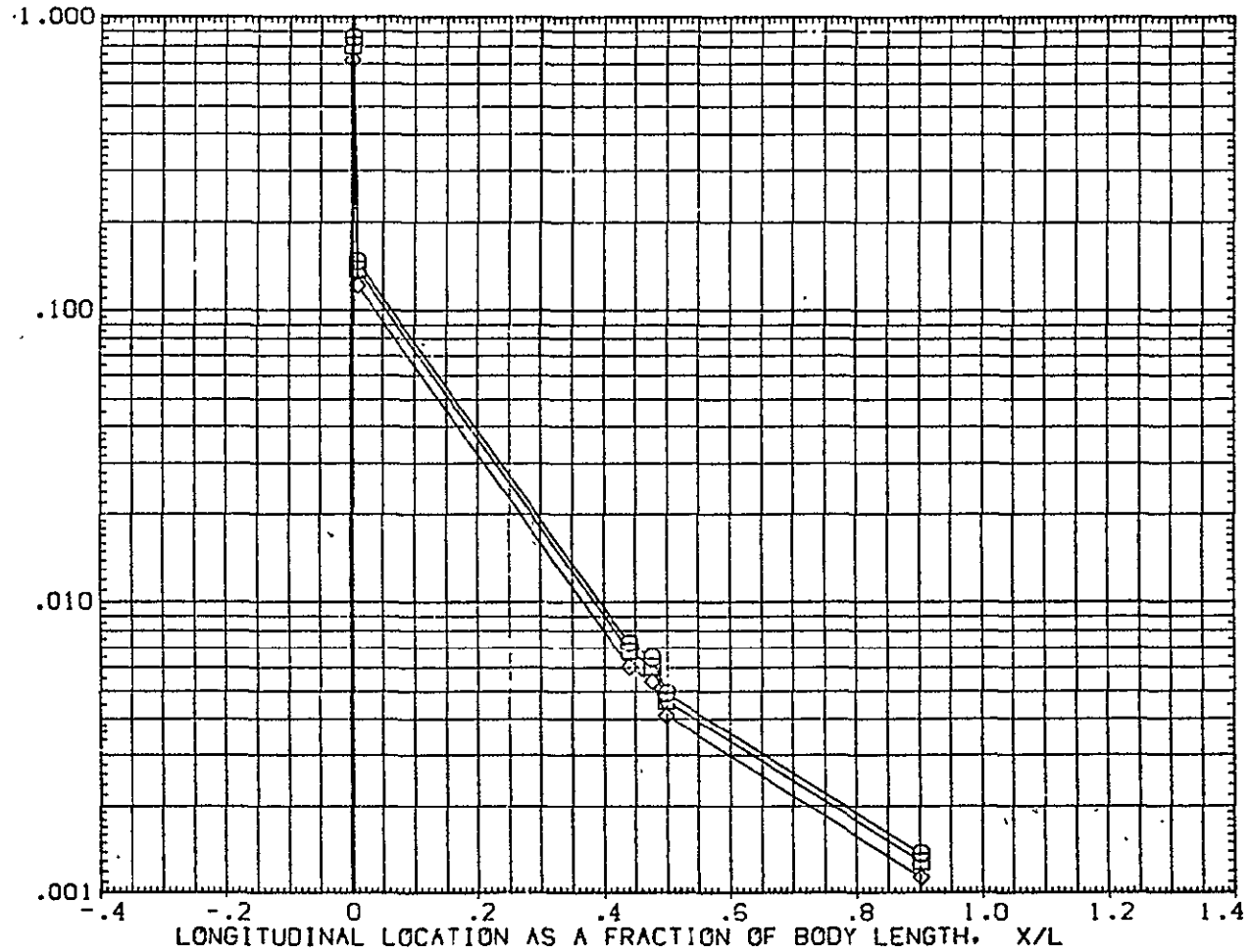


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	221.000	18.950	ALPHA	.000	BETA
□	.900					.000
◇	1.000					

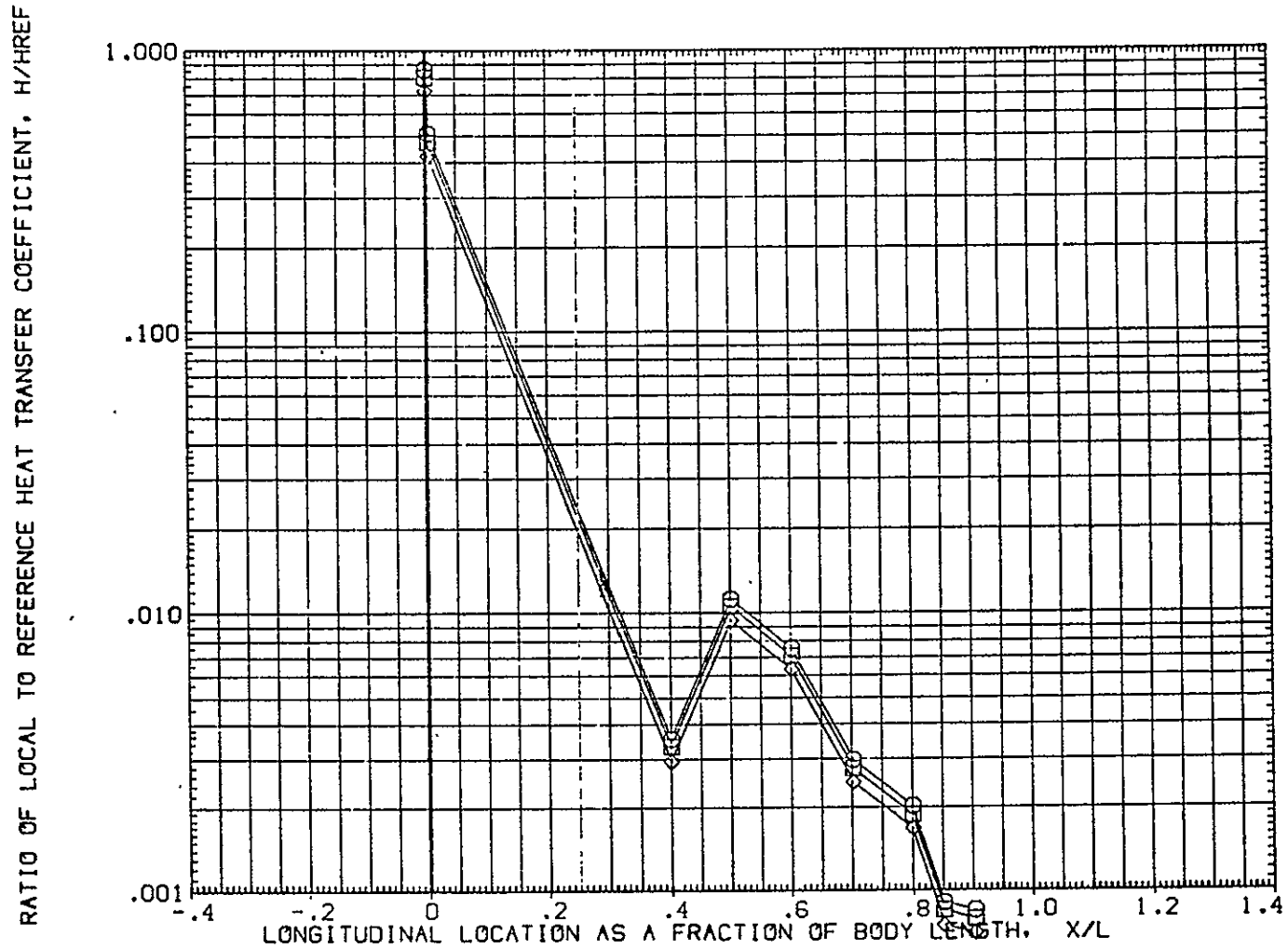


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	241.000	18.950	.000	.000	.000
□	.900					
◇	1.000					

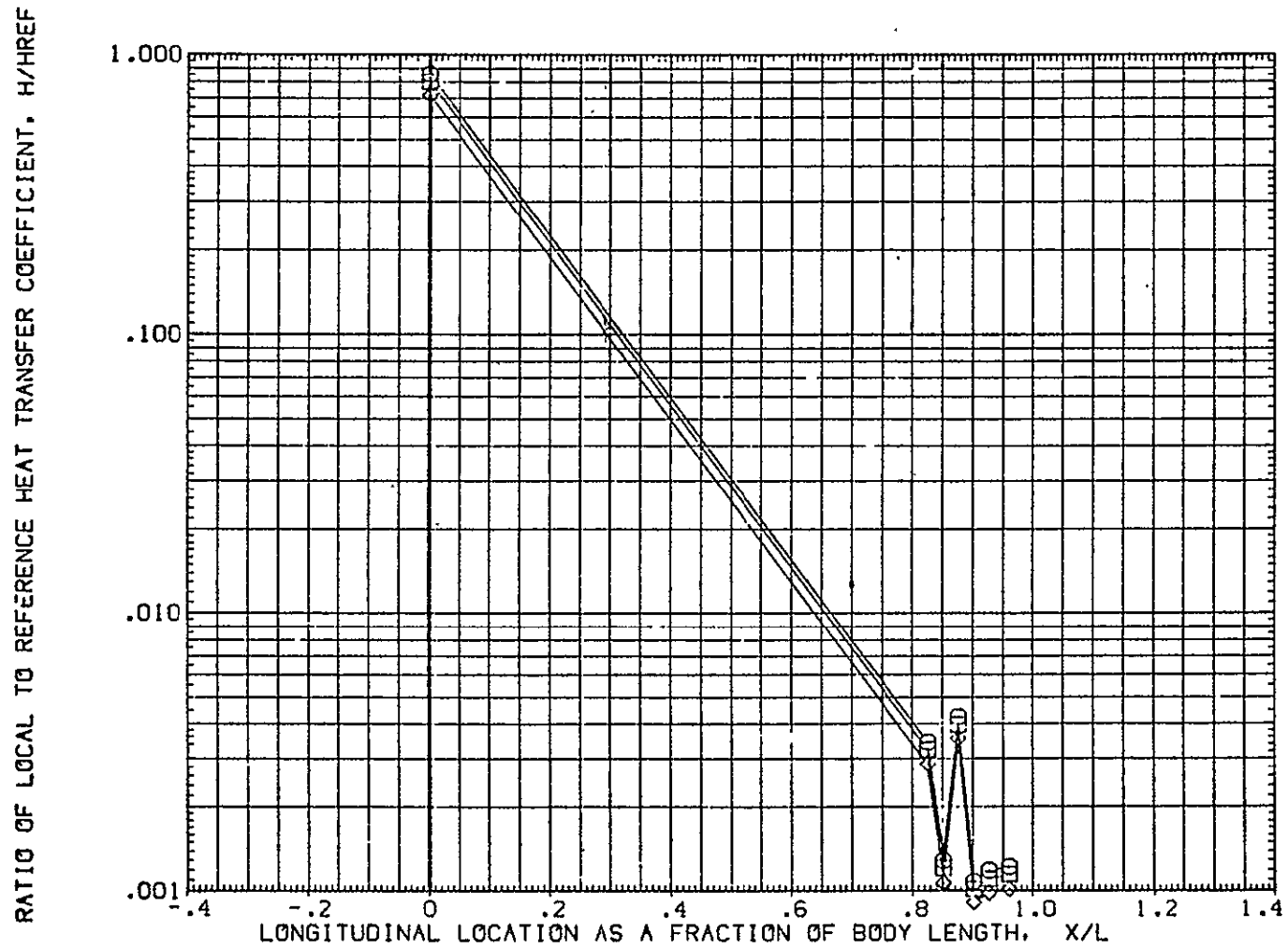


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/L $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	BETA	PARAMETRIC VALUES
◇	.850	247.000	18.950	.000	.000	
□	.950					
○	1.000					

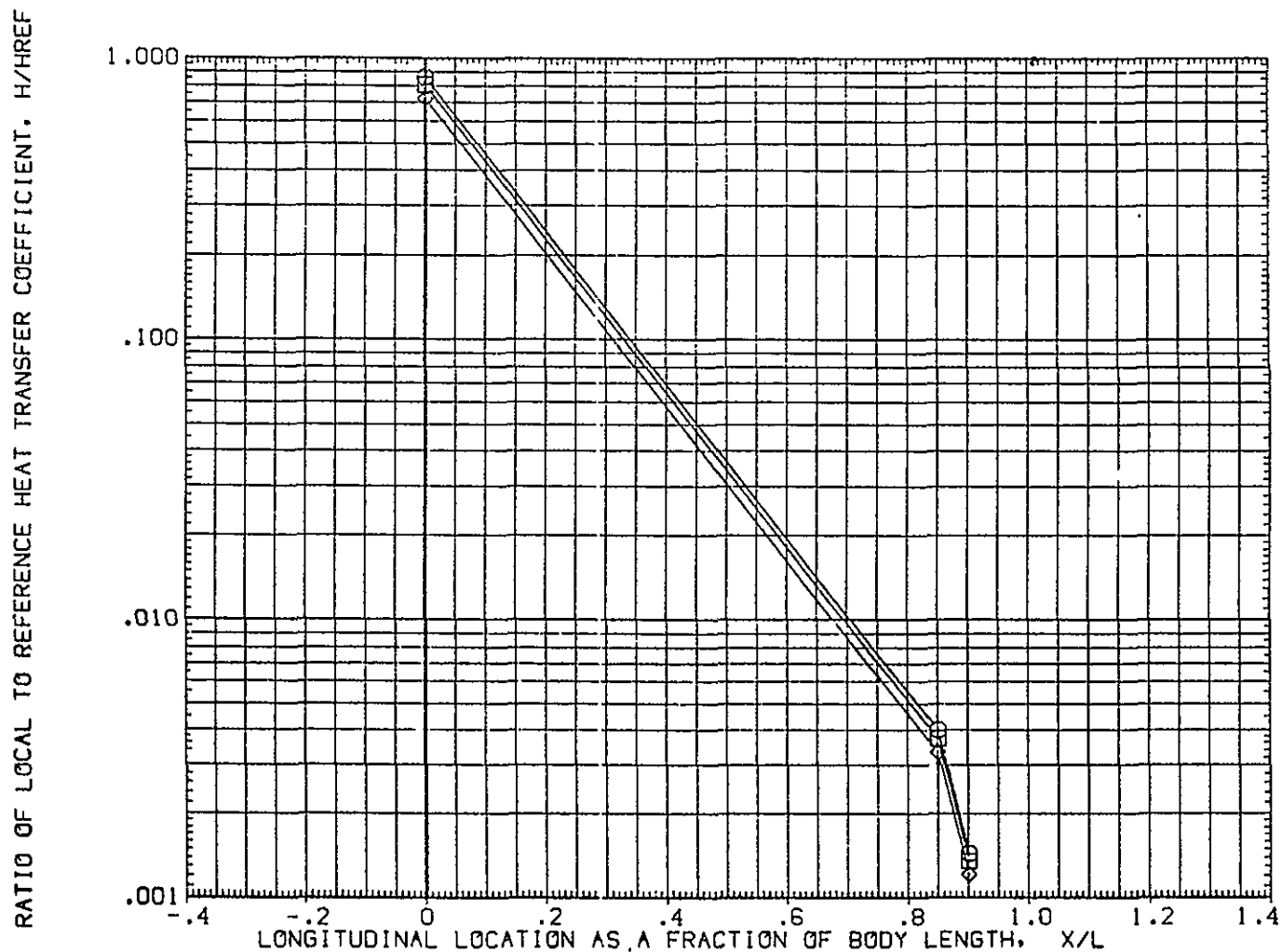


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
◇	.850	270.000	18.950	ALPHA	.000	BETA
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

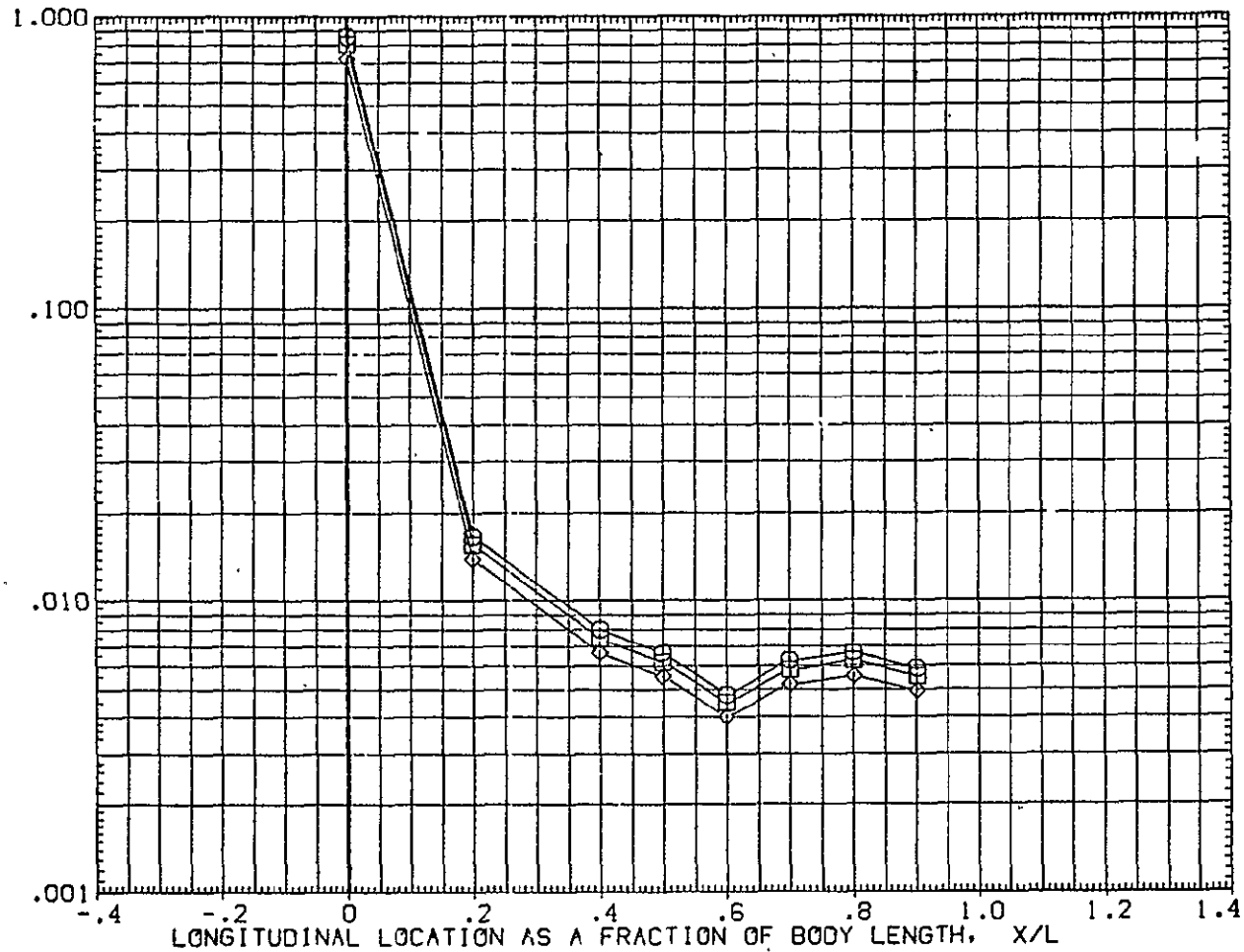


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT05)

SYMBOL	HAW/H*	PHI	MACH	PARAMETRIC VALUES		
○	.850	315.000	18.950	ALPHA	.000	BETA
□	.900					.000
◇	1.000					

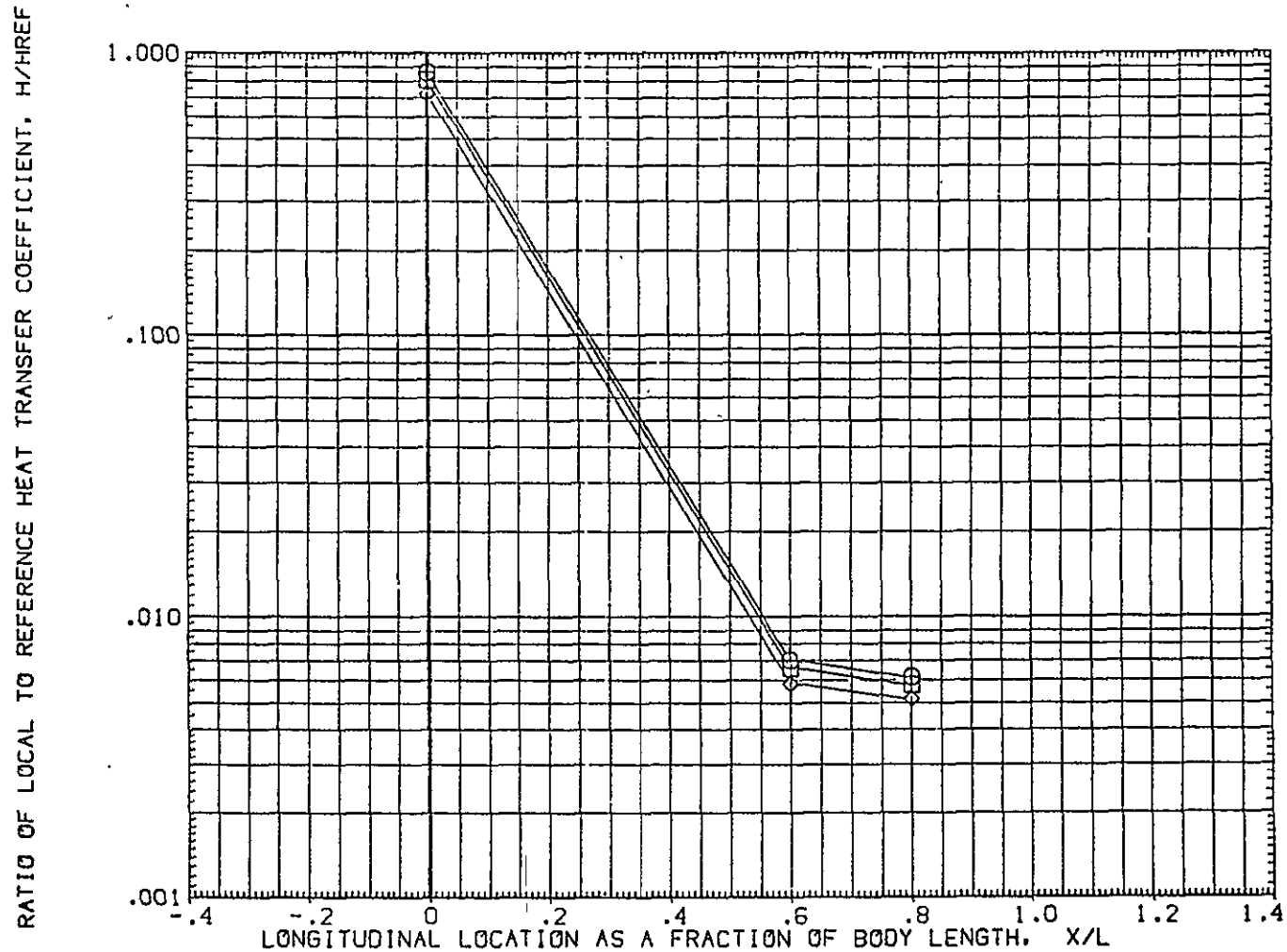


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/T(01) TANK (IUGT05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	
○	.900	.000	7.000		.000		.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

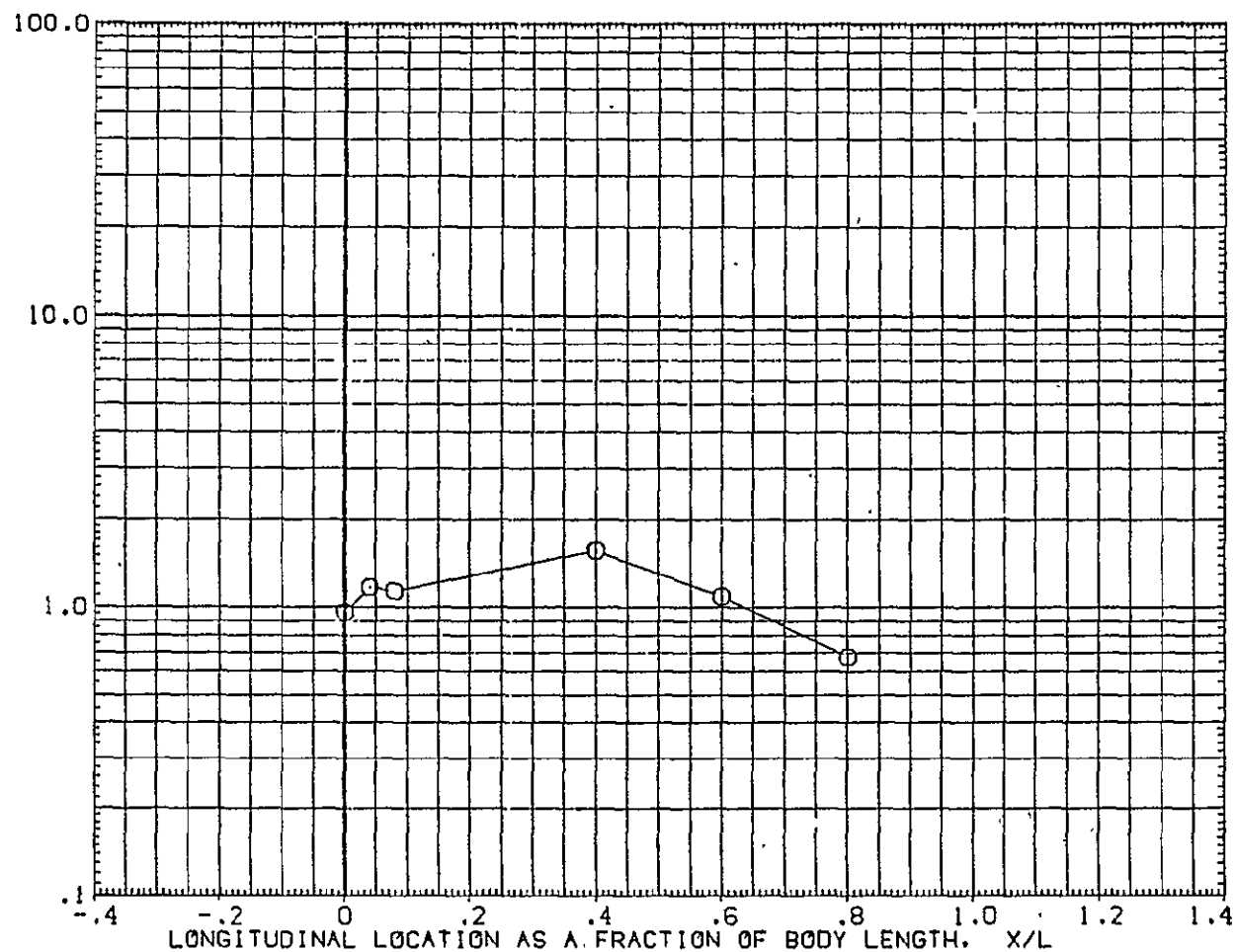


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/T(01) TANK (1UGT05)

SYMBOL
O
HAW/HT
.900
PHI
180.000
MACH
7.000

PARAMETRIC VALUES
ALPHA
.000
BETA
.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

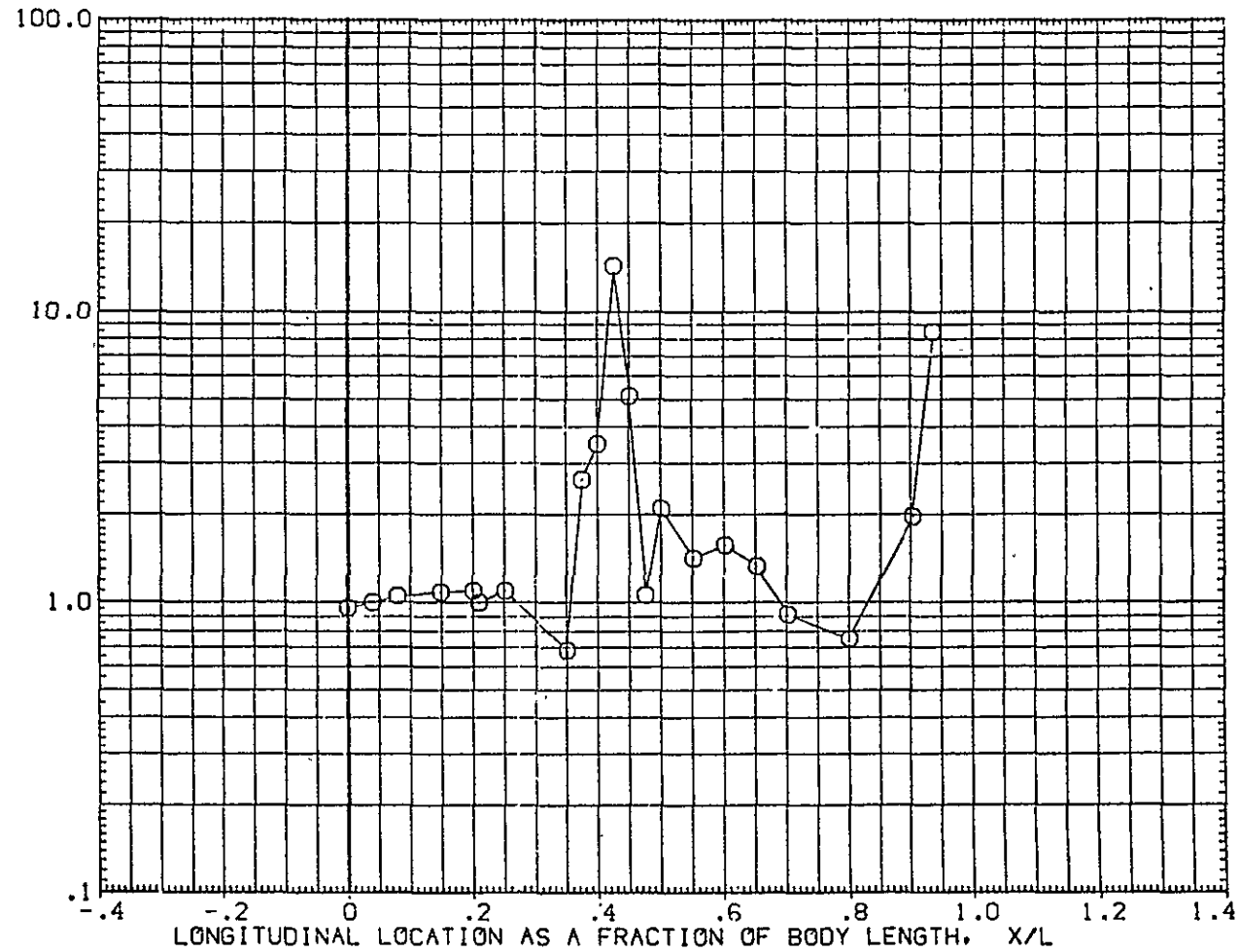


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12 + [H21 MODEL 37 OT(05)/T(01) TANK

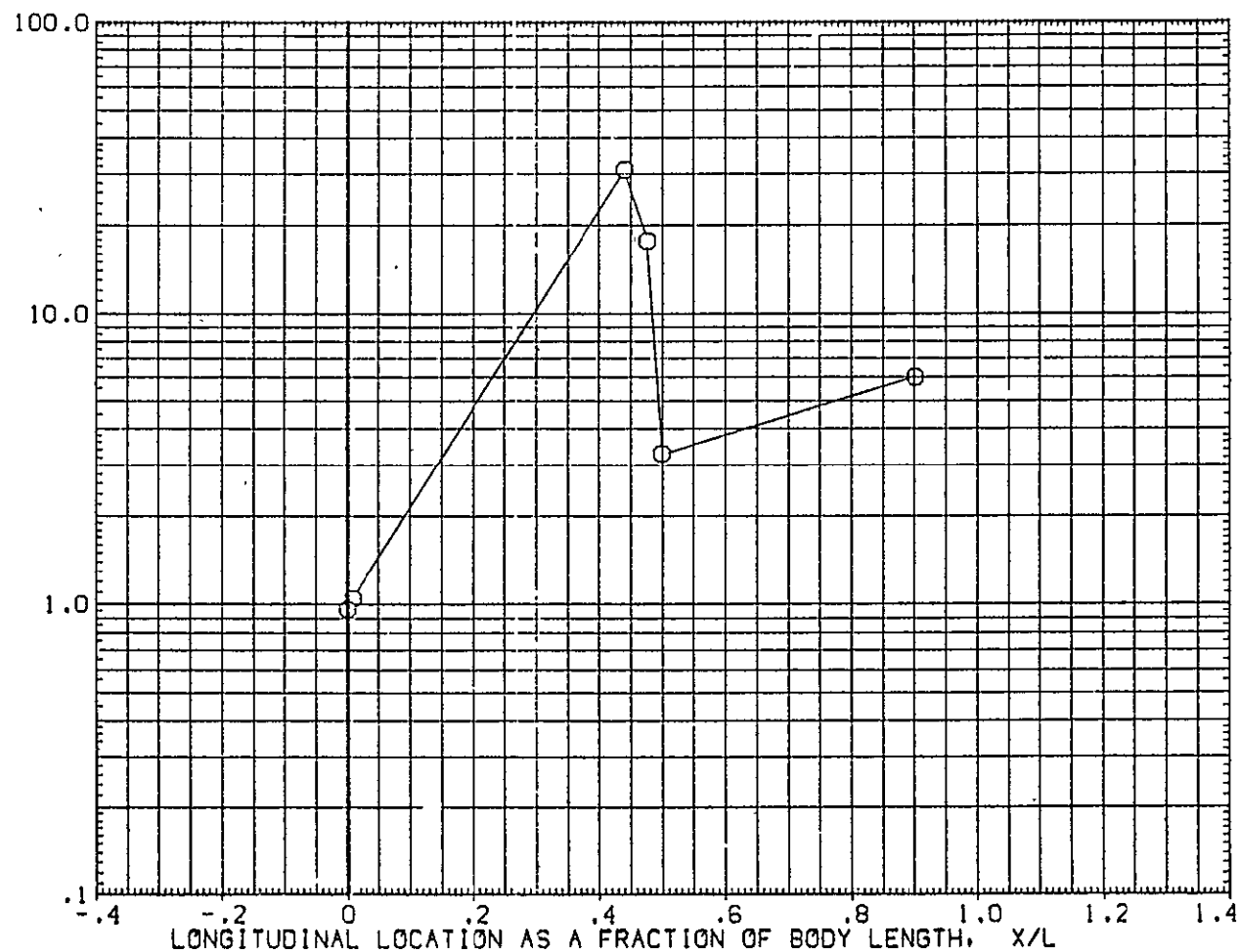
(1UGT05)

SYMBOL
OHAW/HT
.900PHI
199.000MACH
7.000

ALPHA

PARAMETRIC VALUES
.000 BETA

.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, h_i/h_u FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/LI ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/T(01) TANK (1UG105)

SYMBOL
O
HAW/HT
.900
PHI
221.000
MACH
7.000

PARAMETRIC VALUES
.000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, h_i/h_u

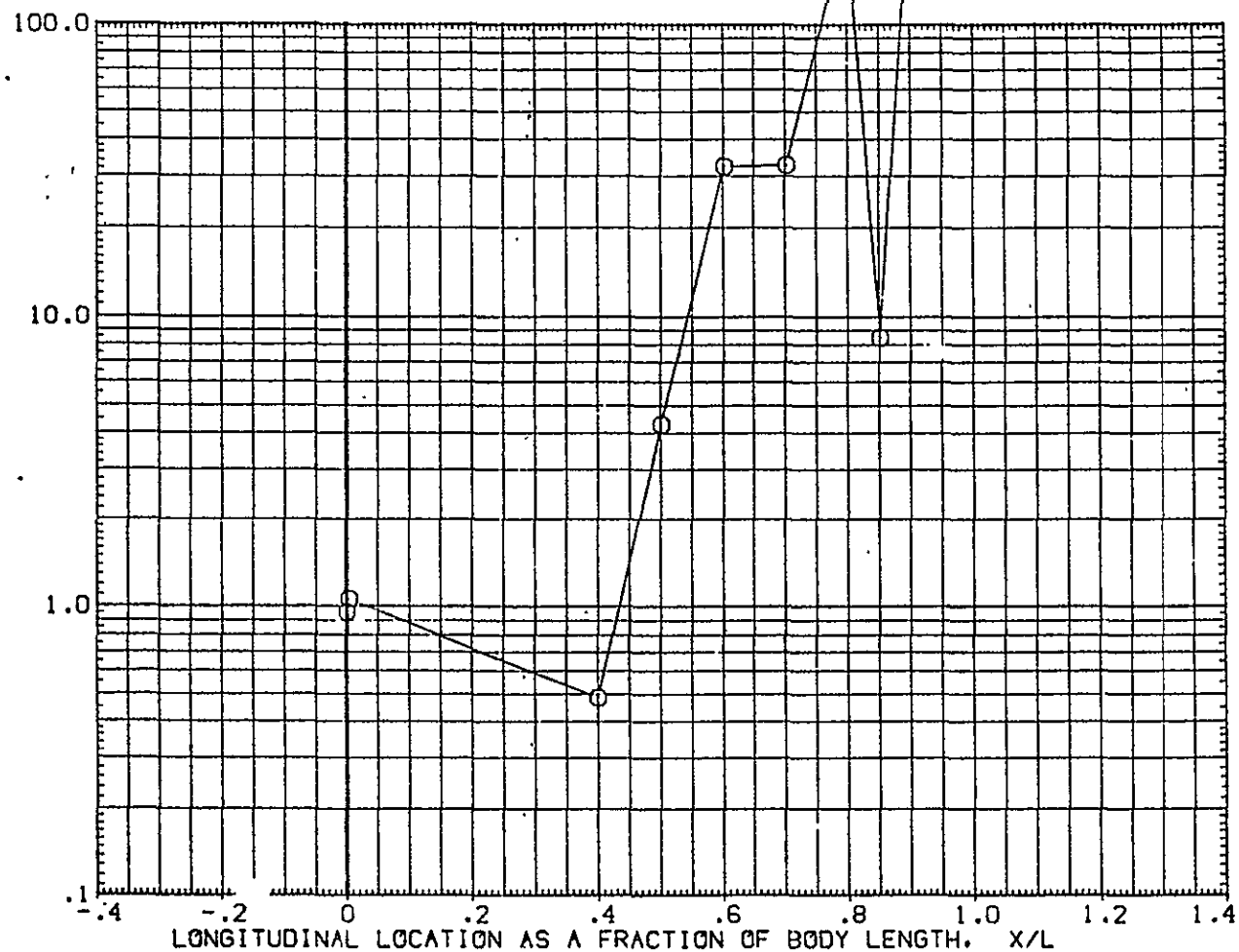


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

GH12 + 1H21 MODEL 37 9T(05)/T(01) TANK (1UGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
O	.900	241.000	7.000	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

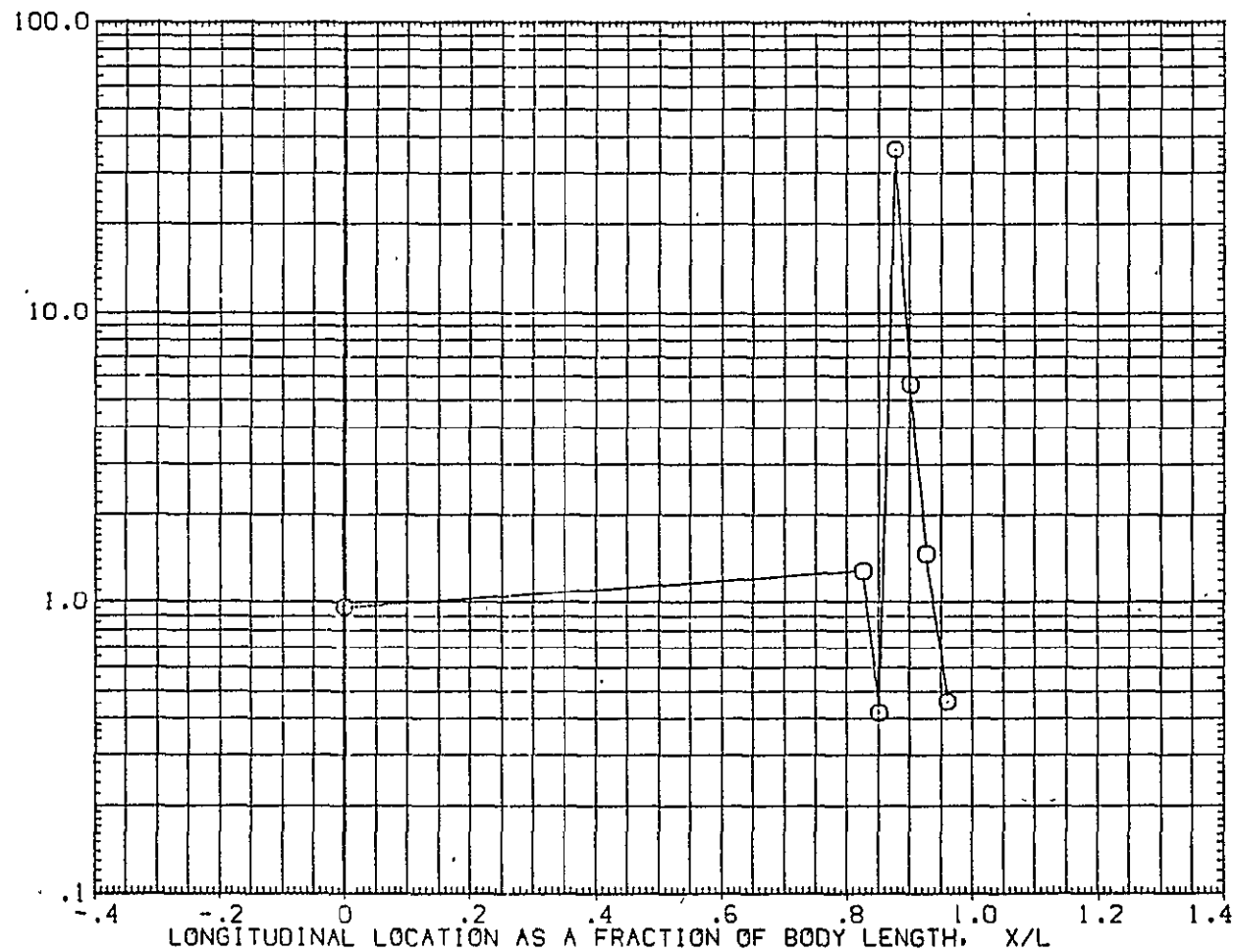


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

SYMBOL
O

HAW/HT .900 PHI 247.000 MACH 7.000

PARAMETRIC VALUES
ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

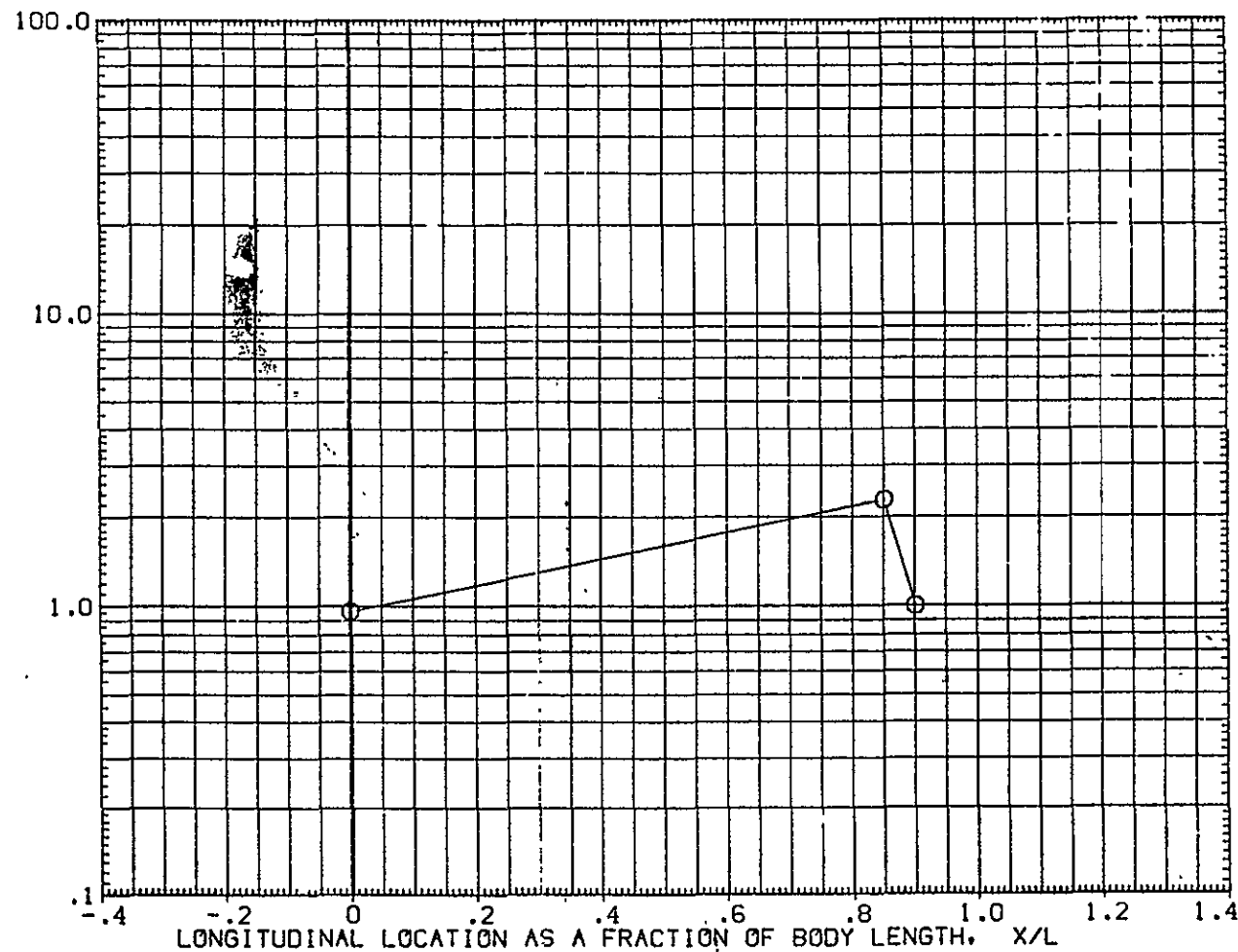


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12 + 1H21 MODEL 37 OT(05)/T(01) TANK (IUGT05)

SYMBOL	MAV/HT	PHI	YACH	ALPHA	PARAMETRIC VALUES	
○	.900	270.000	7.000		.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

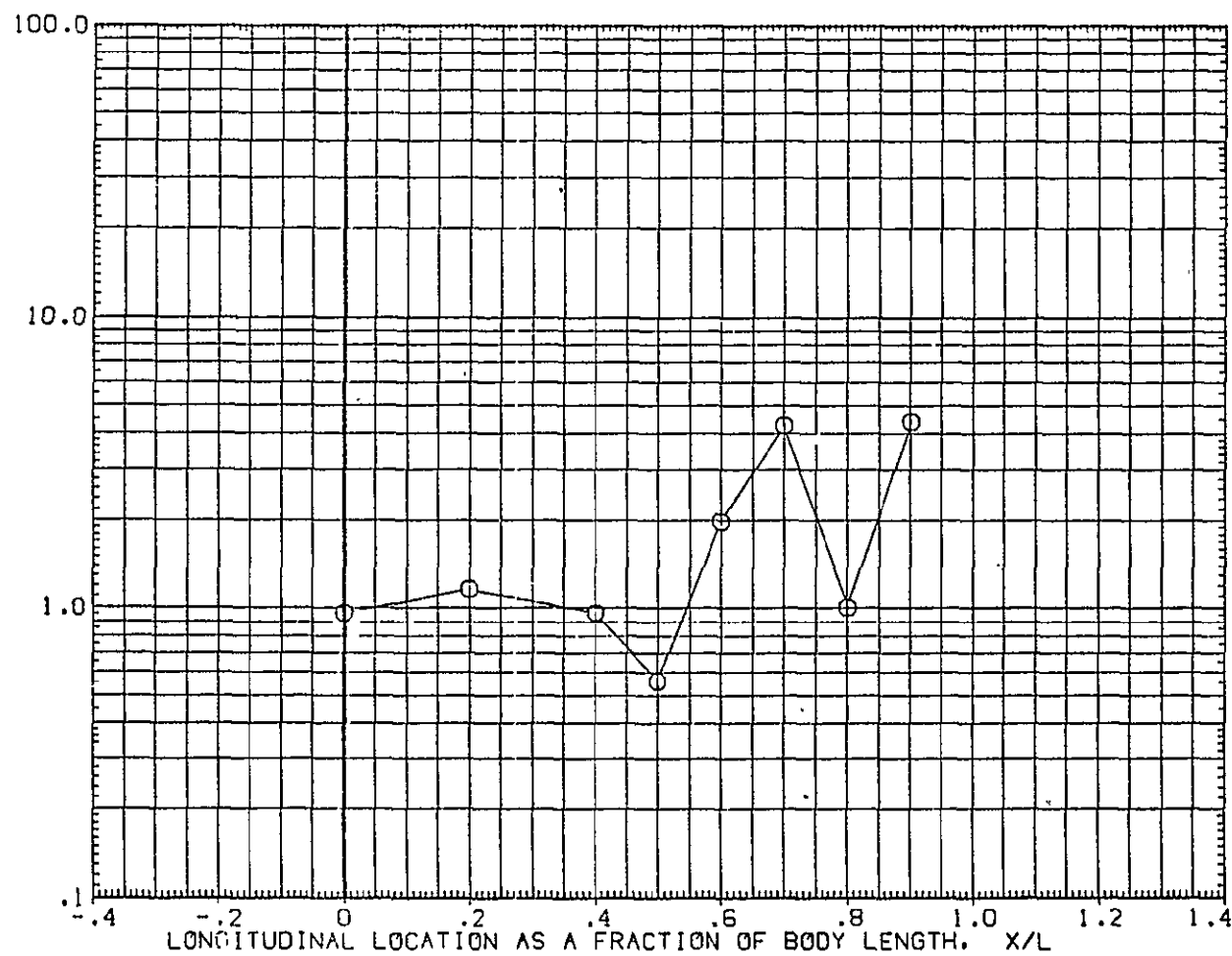


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12 + IH21 MODEL 37 0T(05)/T(01) TANK (IUGT05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.900	315.000	7.000	.000	BETA	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

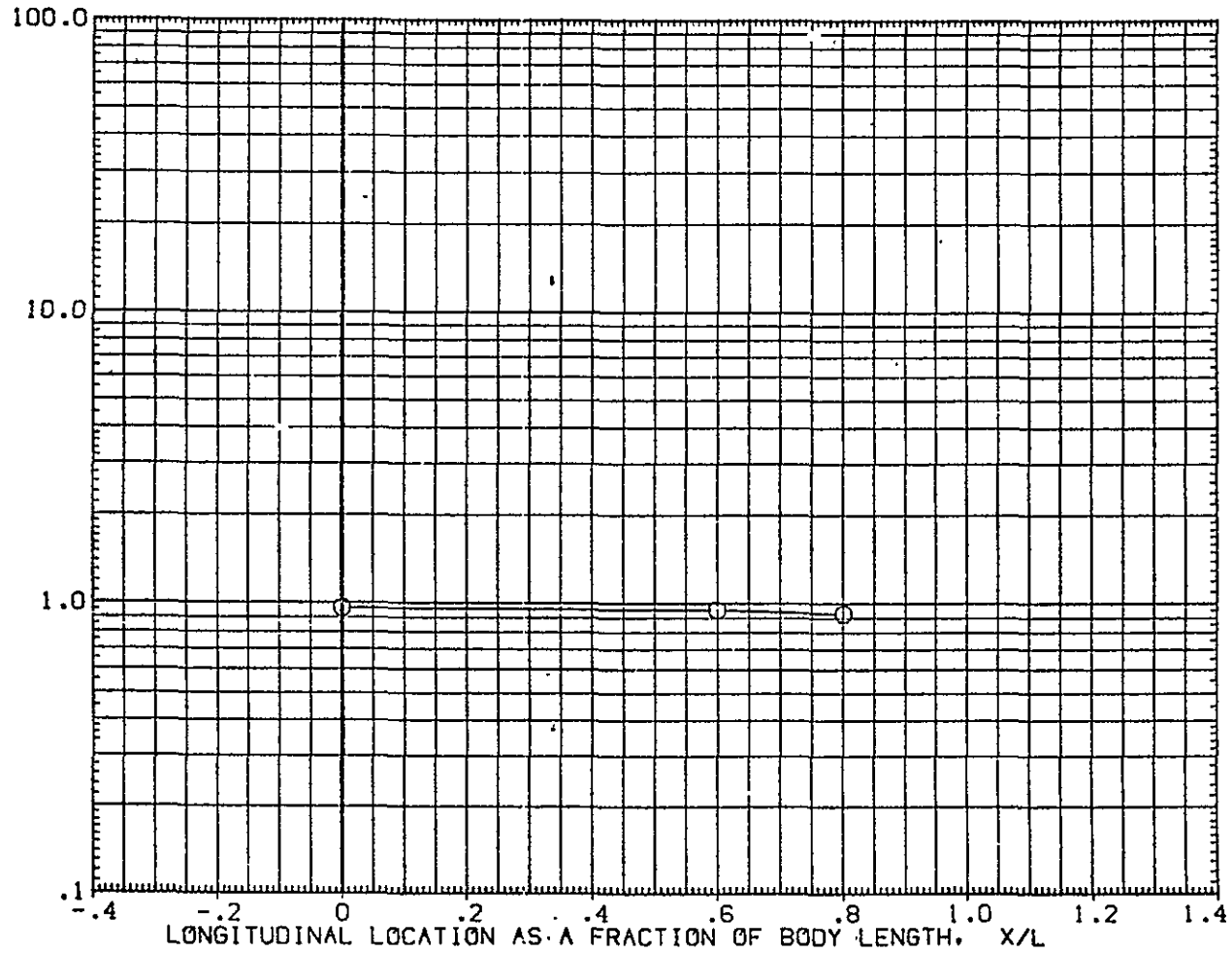


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/LI ALPHA = 0

OH12 + 1H21 MODEL 37 OT(05)/T(01) TANK (1UGT05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
O	.900	.000	7.610	.000	BETA	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

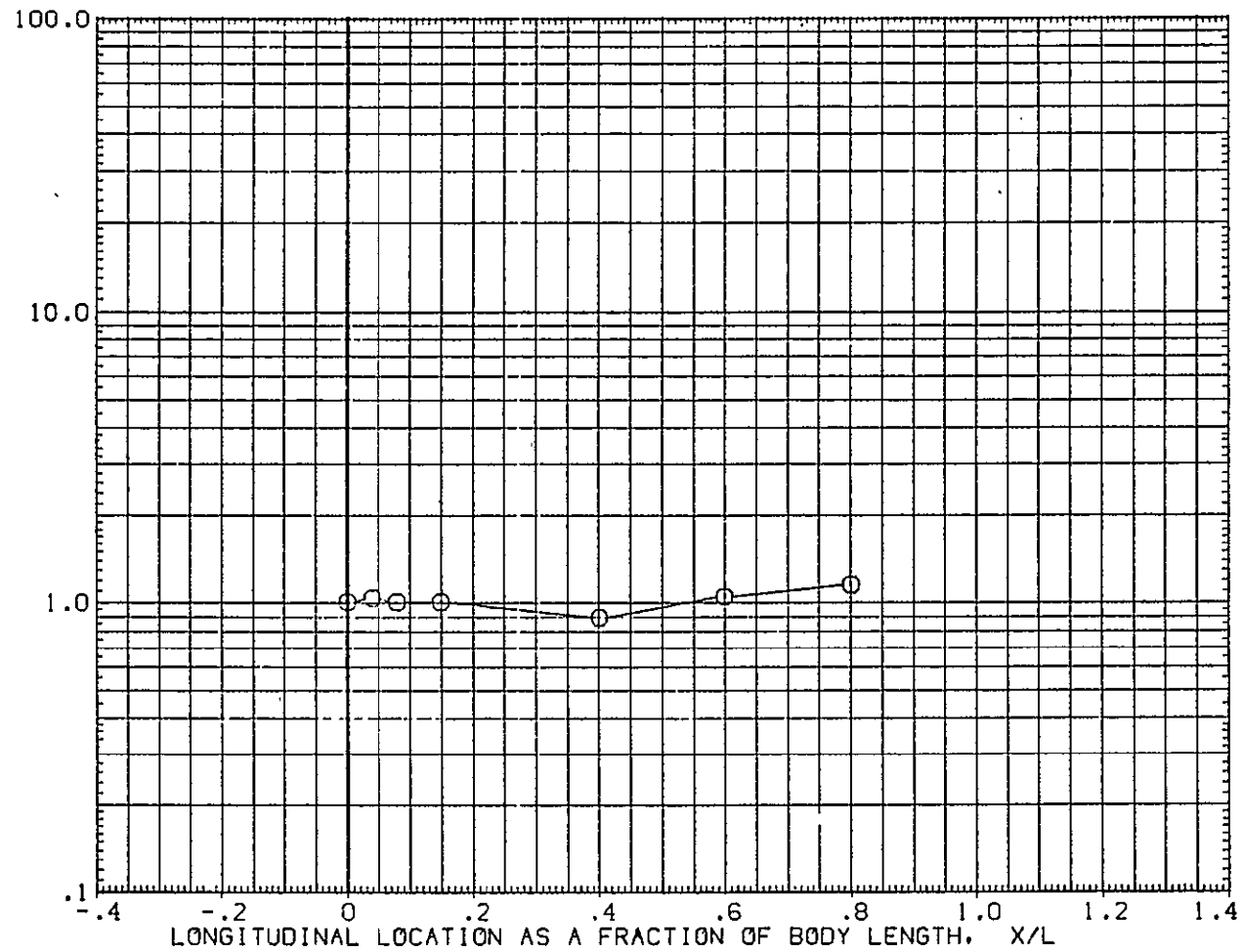


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ $\alpha = 0$

OH12 + IH21 MODEL 37 OT(05)/T(01) TANK (IUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
O	.900	180.000	7.610	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, h_i/h_u

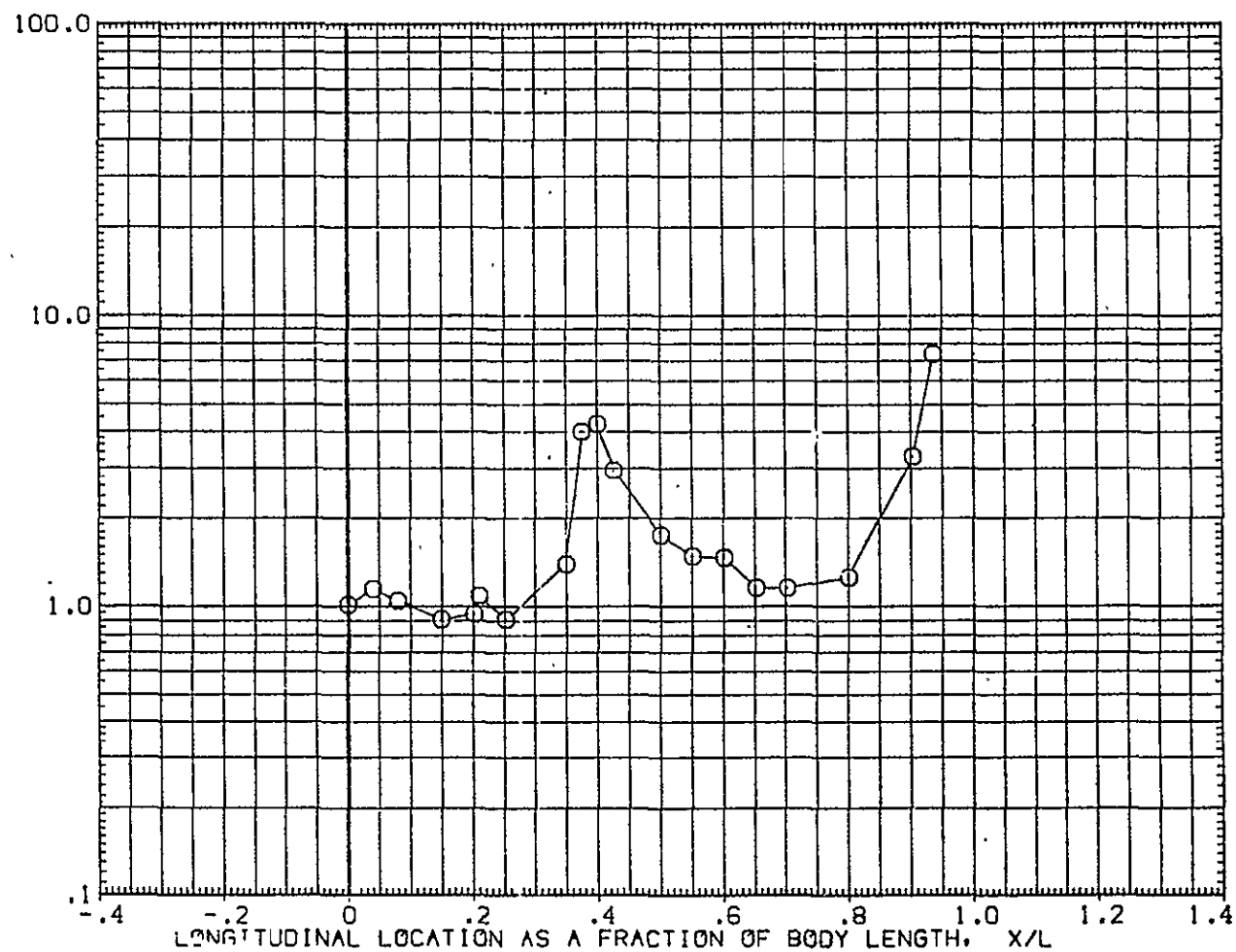


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/T(01) TANK

(IUGT05)

SYMBOL HAW/HT PH1 MACH
 O .900 199.000 7.610

PARAMETRIC VALUES
 ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO DISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

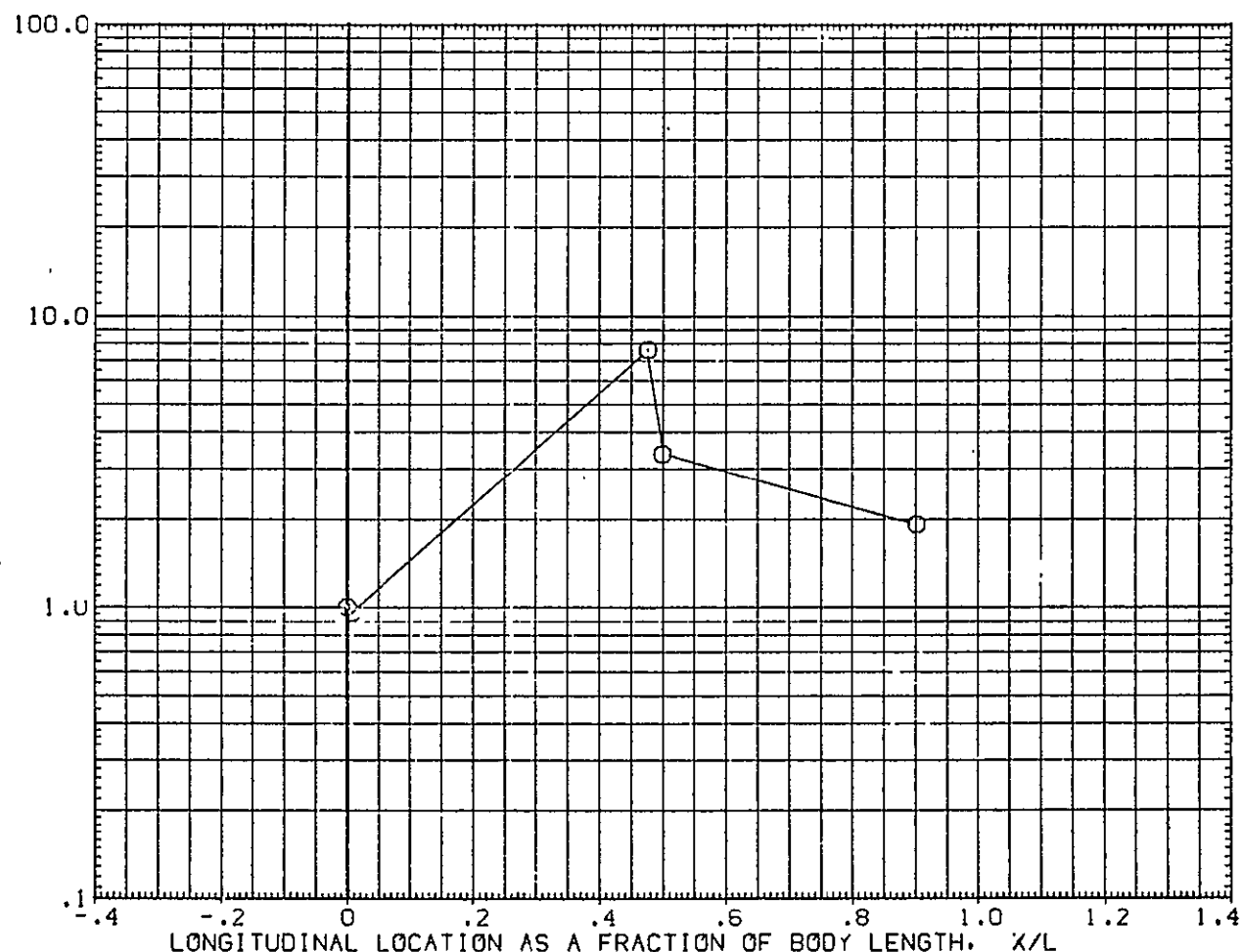


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/L ALPHA = 0

OH12 + IH21 MODEL 37 0T(05)/1(01) TANK (1UGT05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	
○	.900	221.000	7.610		.000		.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

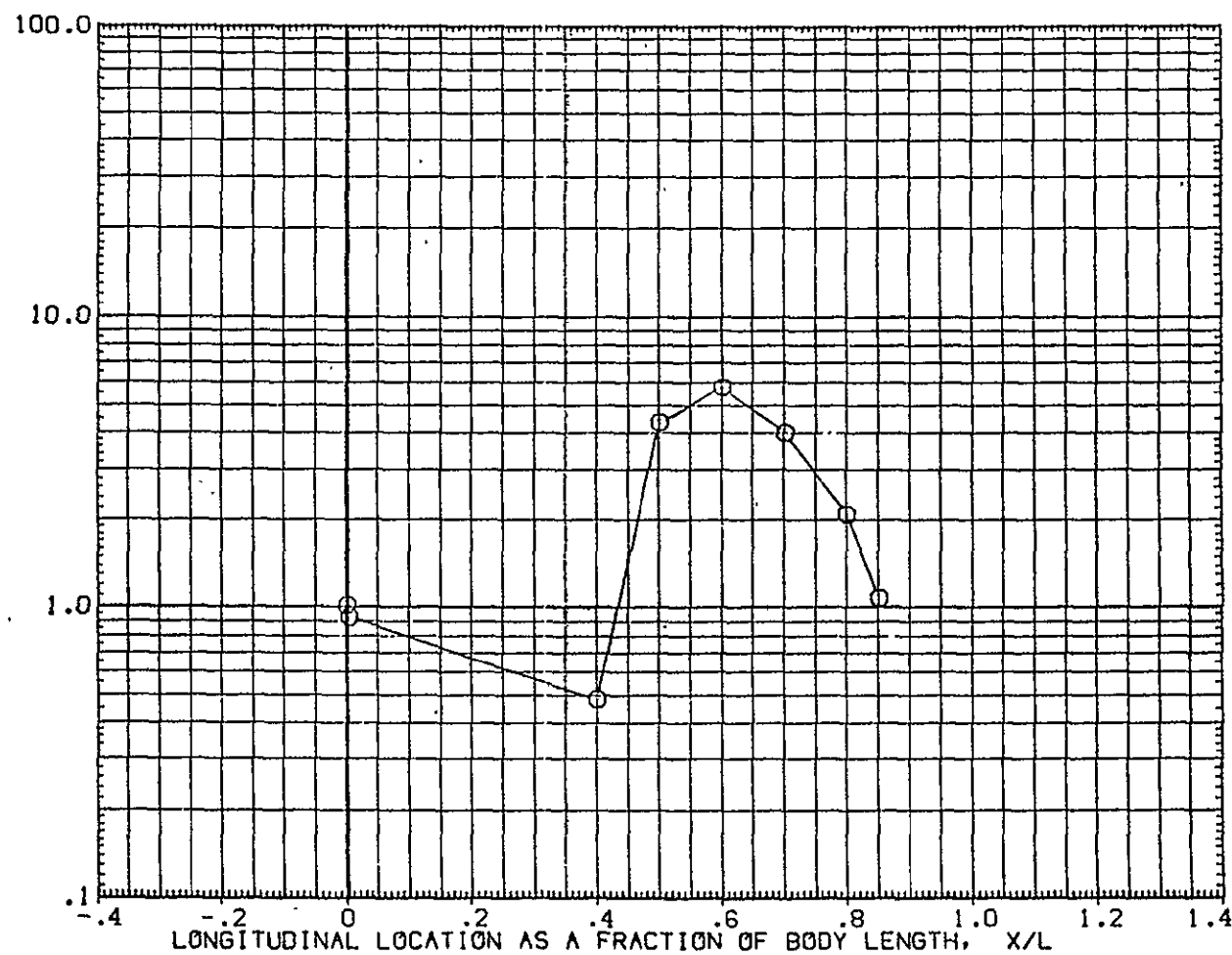


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/T(01) TANK (1UGT05)

SYMBOL
O
HAW/HT
.900
PHI
241.000
MACH
7.610

PARAMETRIC VALUES
ALPHA
.000
BETA
.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

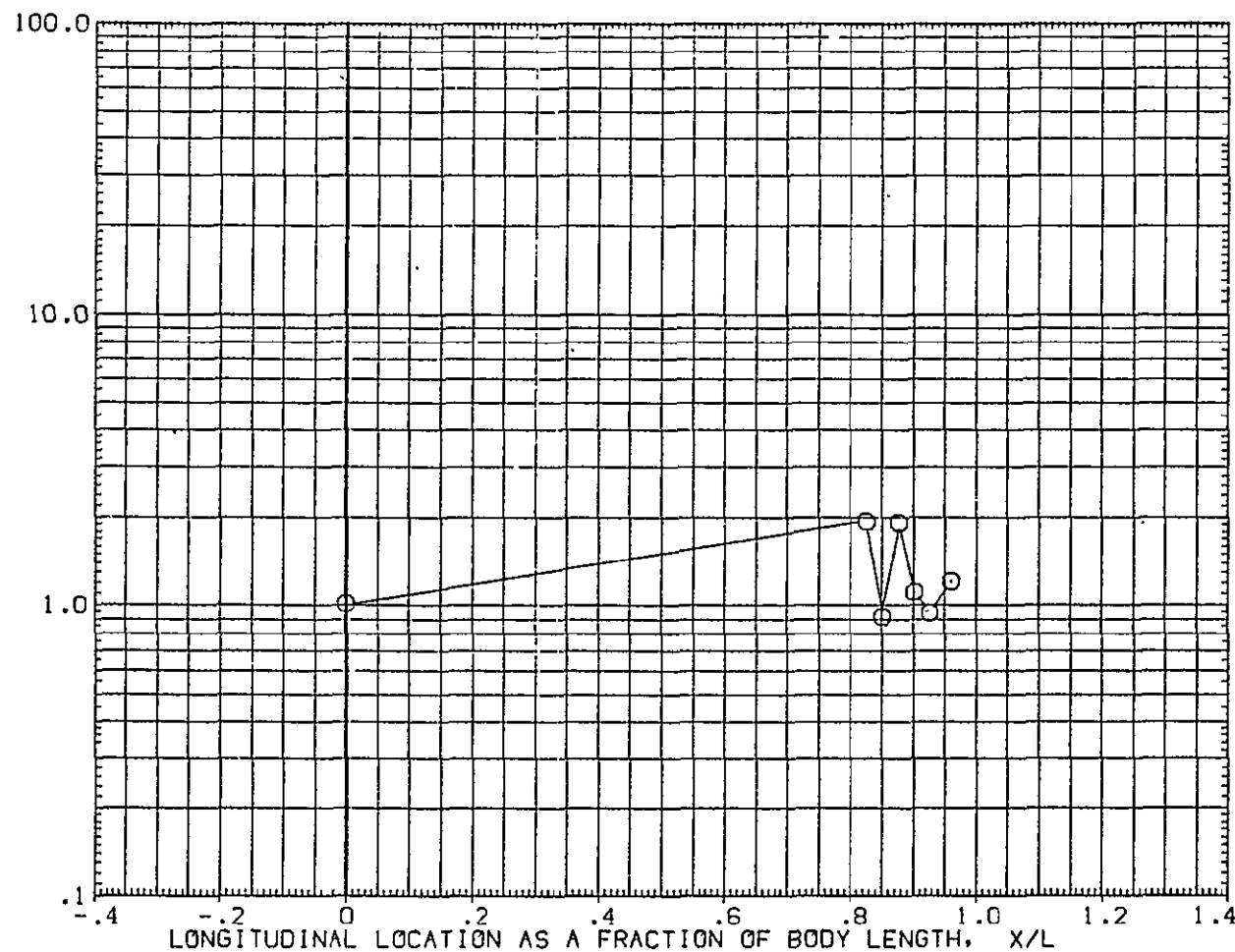


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/T(01) TANK (1UGT05)

SYMBOL
O
HAW/HT
.900
PHI
247.000
MACH
7.610

PARAMETRIC VALUES
ALPHA
.000
BETA
.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

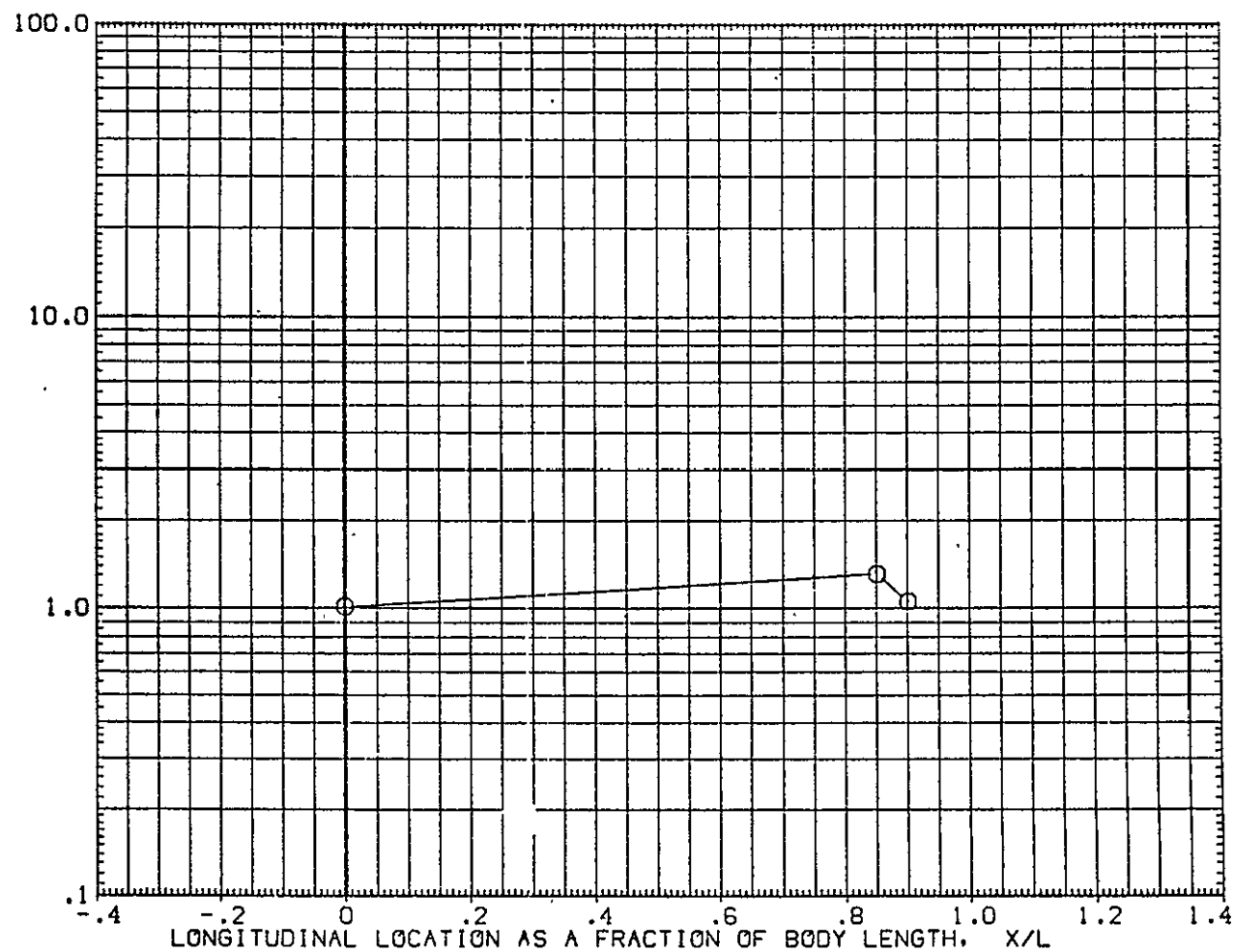


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/T(01) TANK (IUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
O	.900	270.000	7.610	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

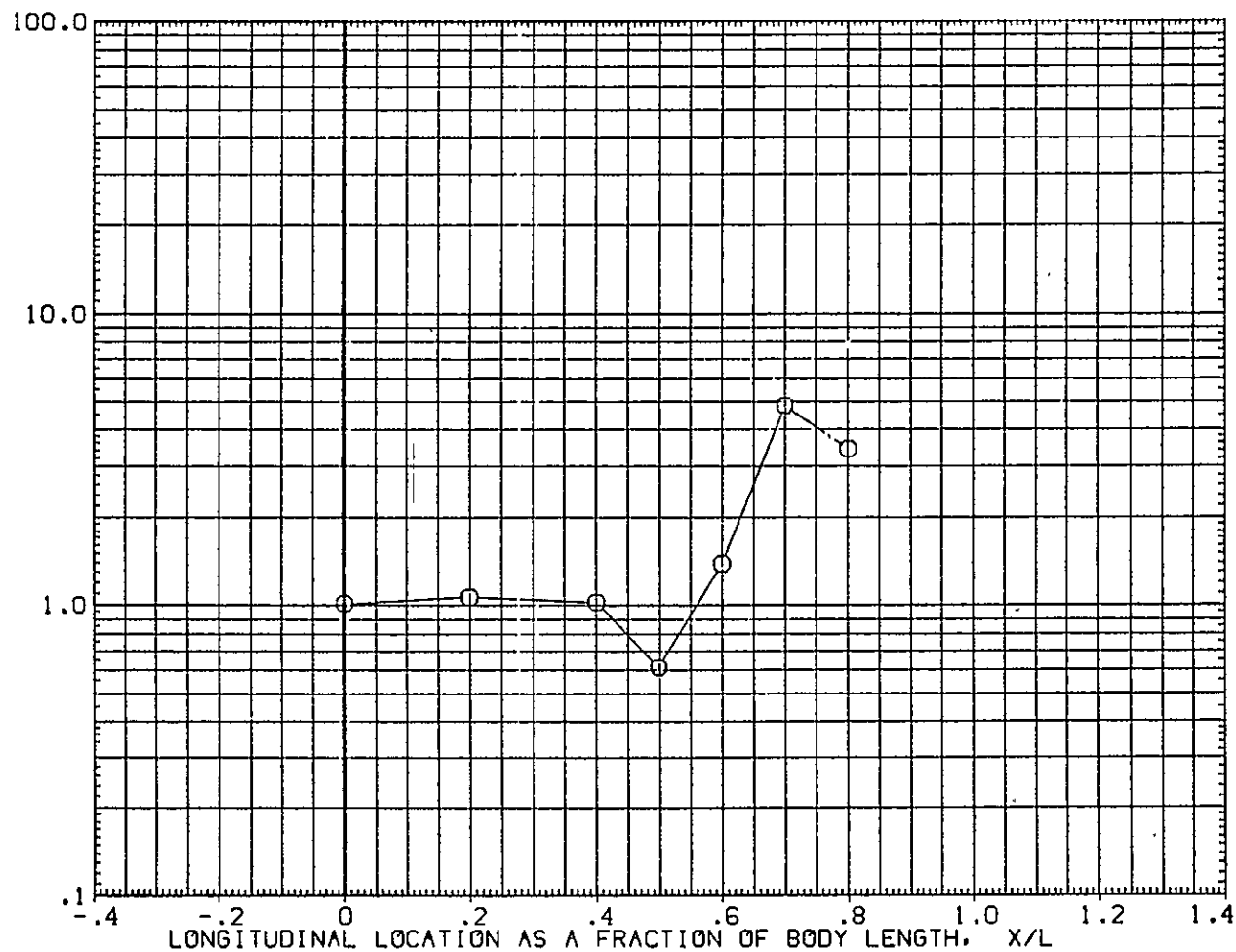


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0-12 + 1H21 MODEL 37 GT(05)/T(01) TANK (1UGT05)

SYMBOL HAW/HT PHI MACH
 O .900 315.000 7.610

PARAMETRIC VALUES
 ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

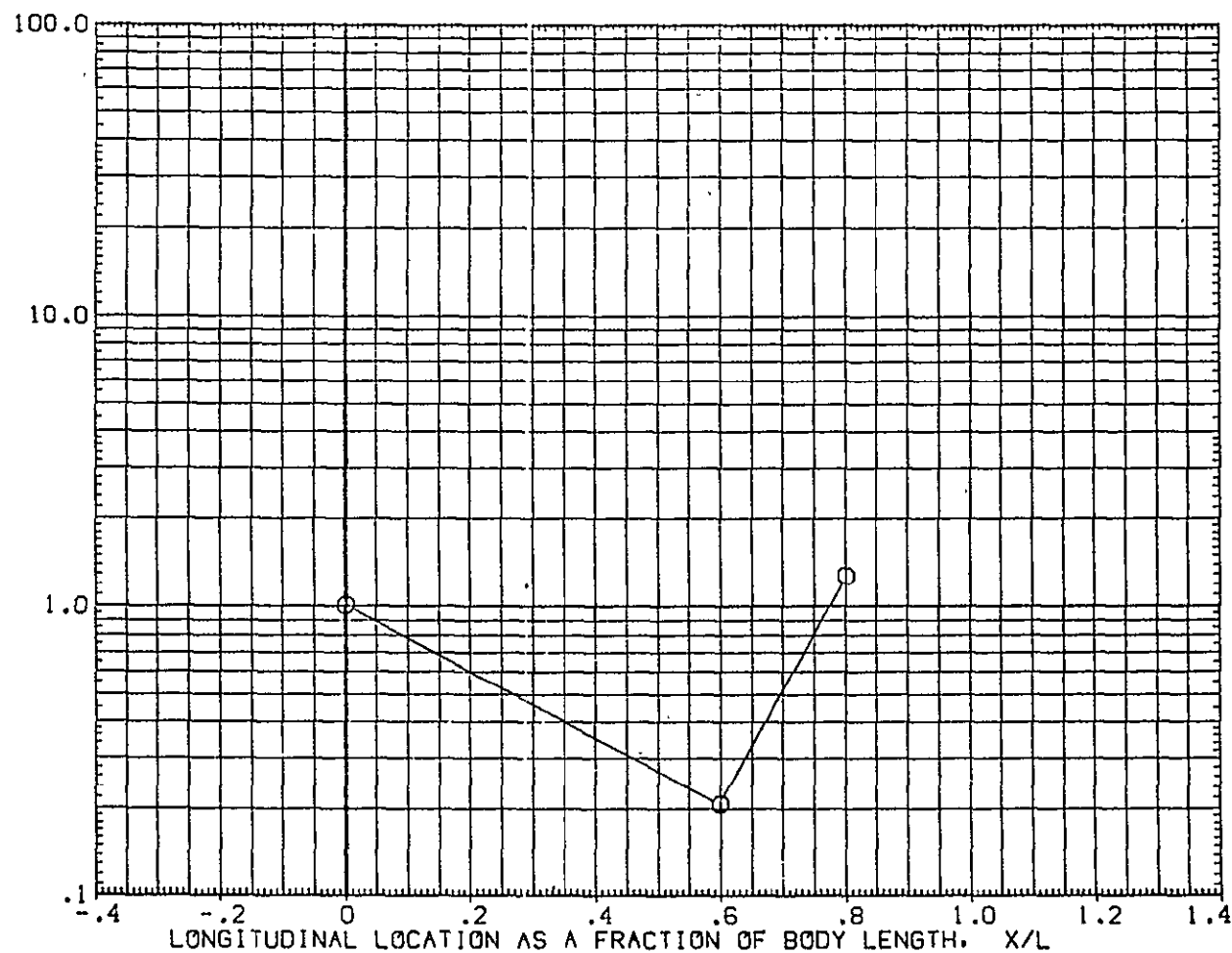


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/T(01) TANK (IUGT05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.900	.000	18.300	.000	BETA	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

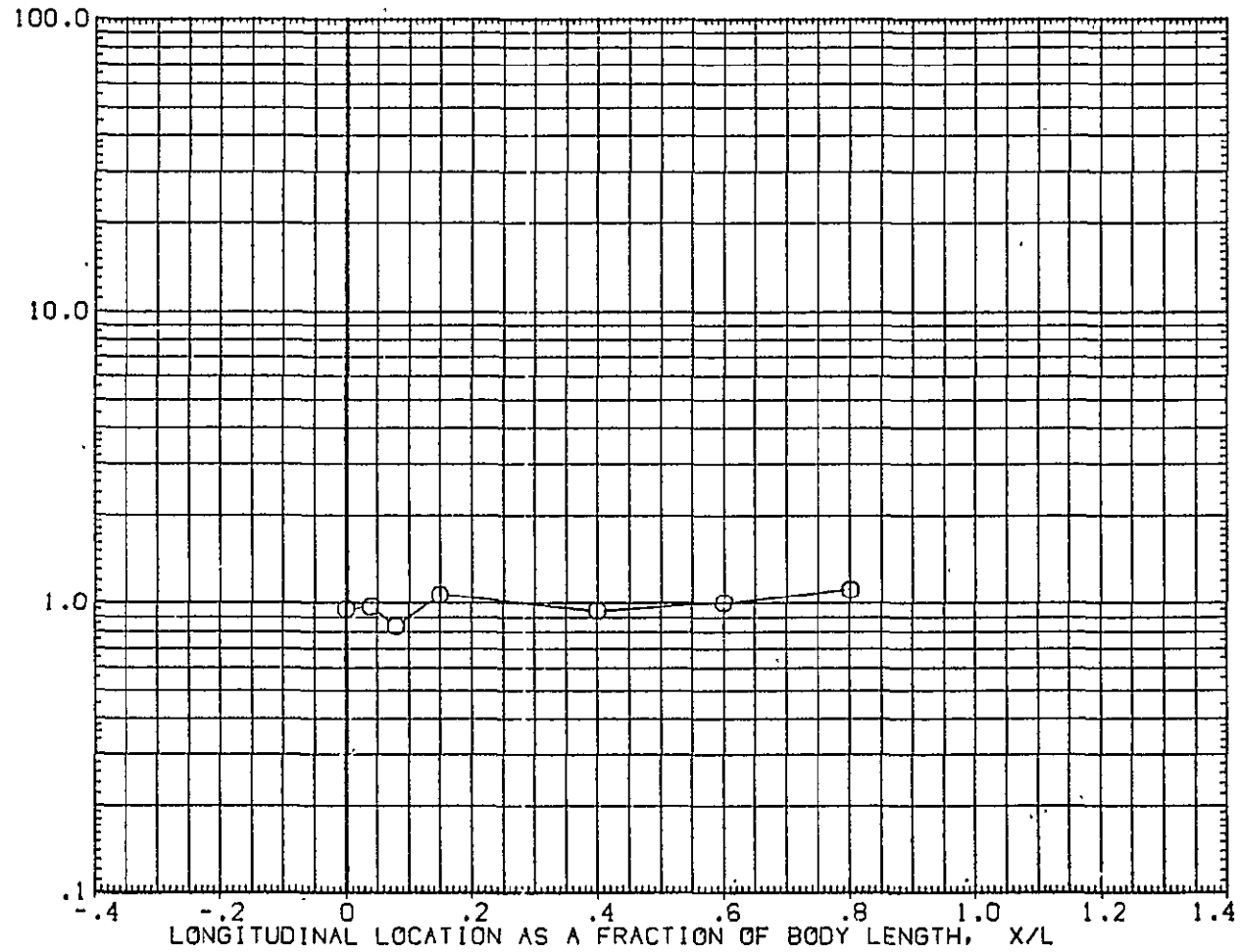


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/T(01) TANK (1UGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES
O	.900	180.000	18.300	ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, h_i/h_u

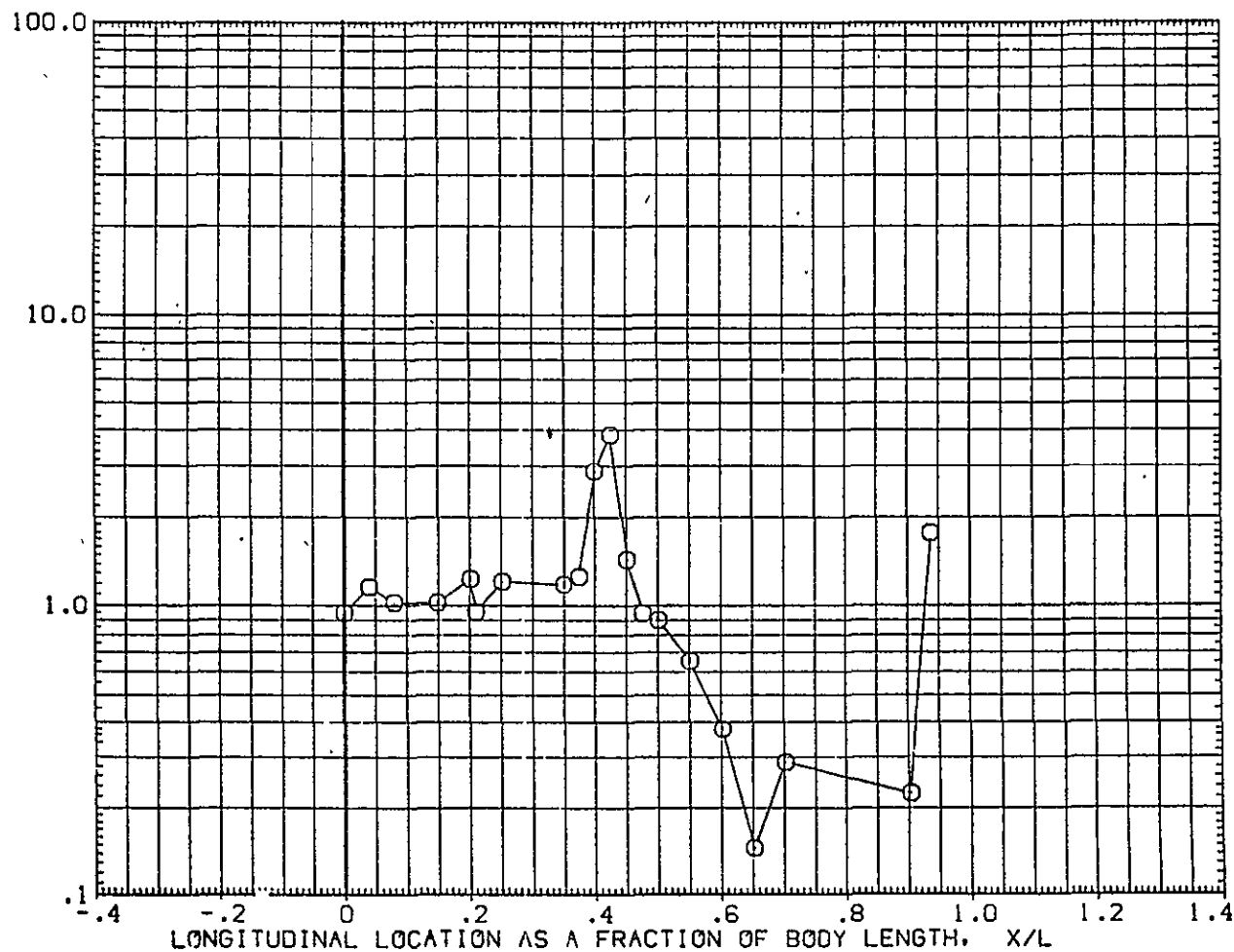


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/T(01) TANK (IUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.900	199.000	18.300	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

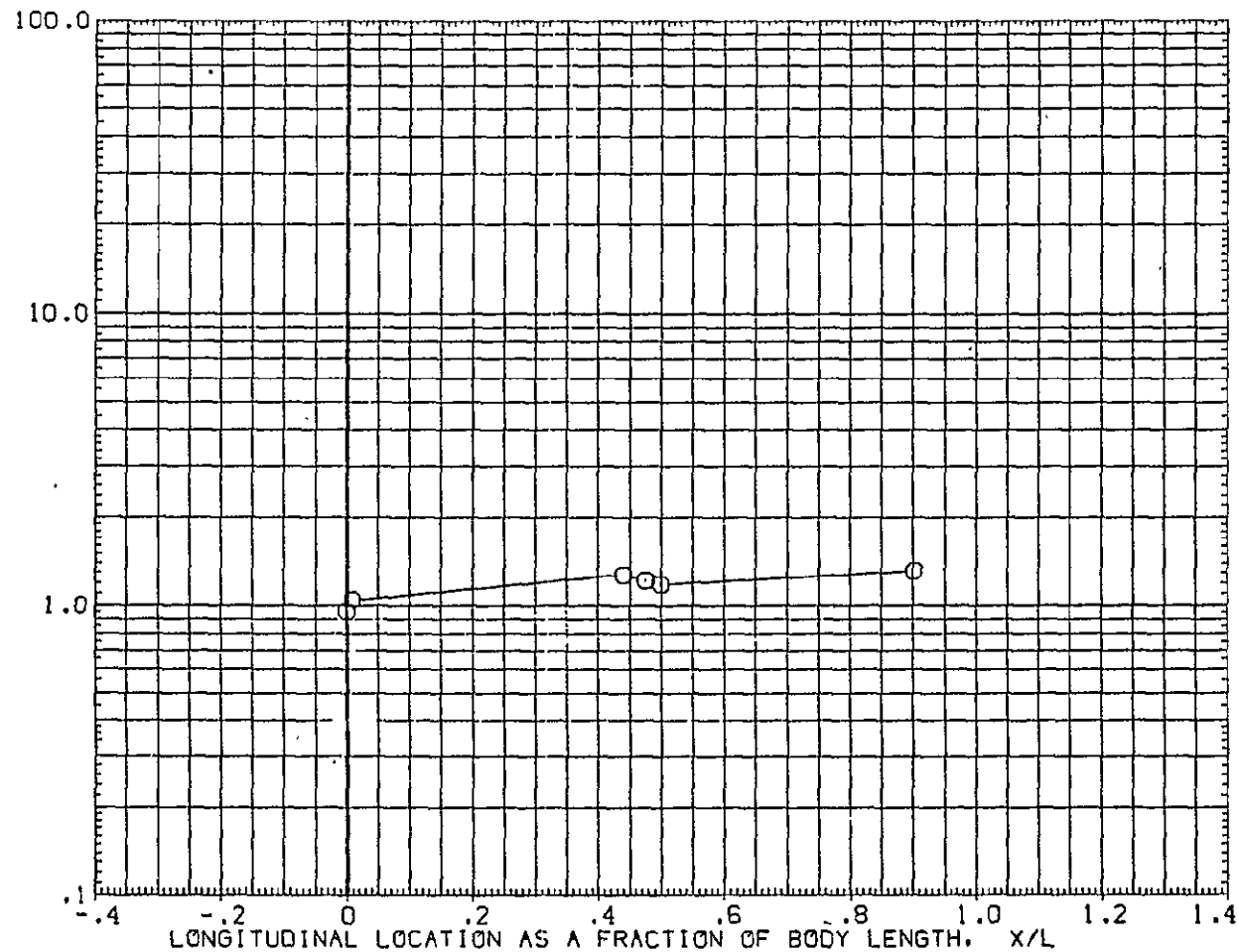


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

0H12 + 1H21 MODEL 37 0T(05)/T(01) TANK (IUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.900	221.000	18.300	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

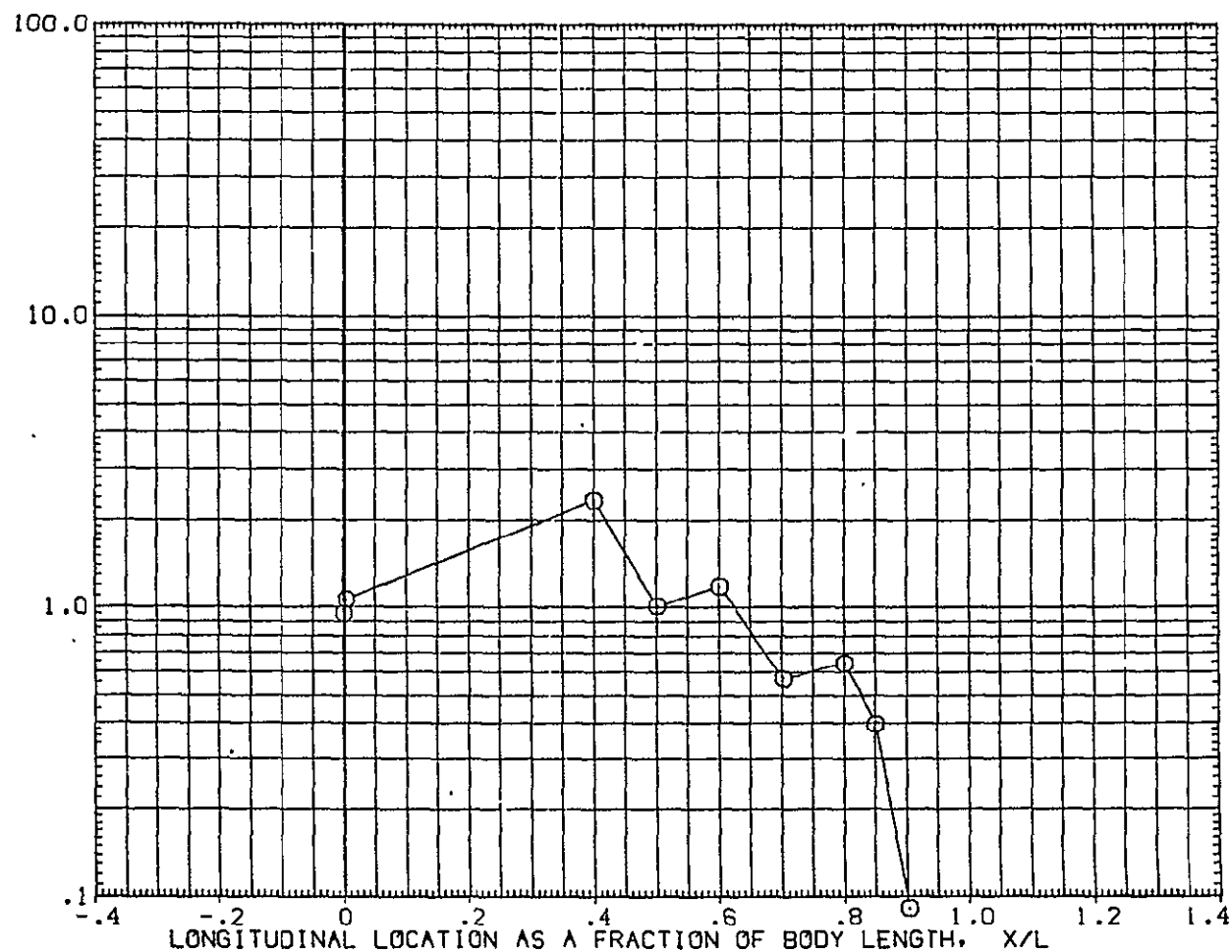


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12 + 1421 MODEL 37 OT(05)/T(01) TANK (1UGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.900	241.000	19.300	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

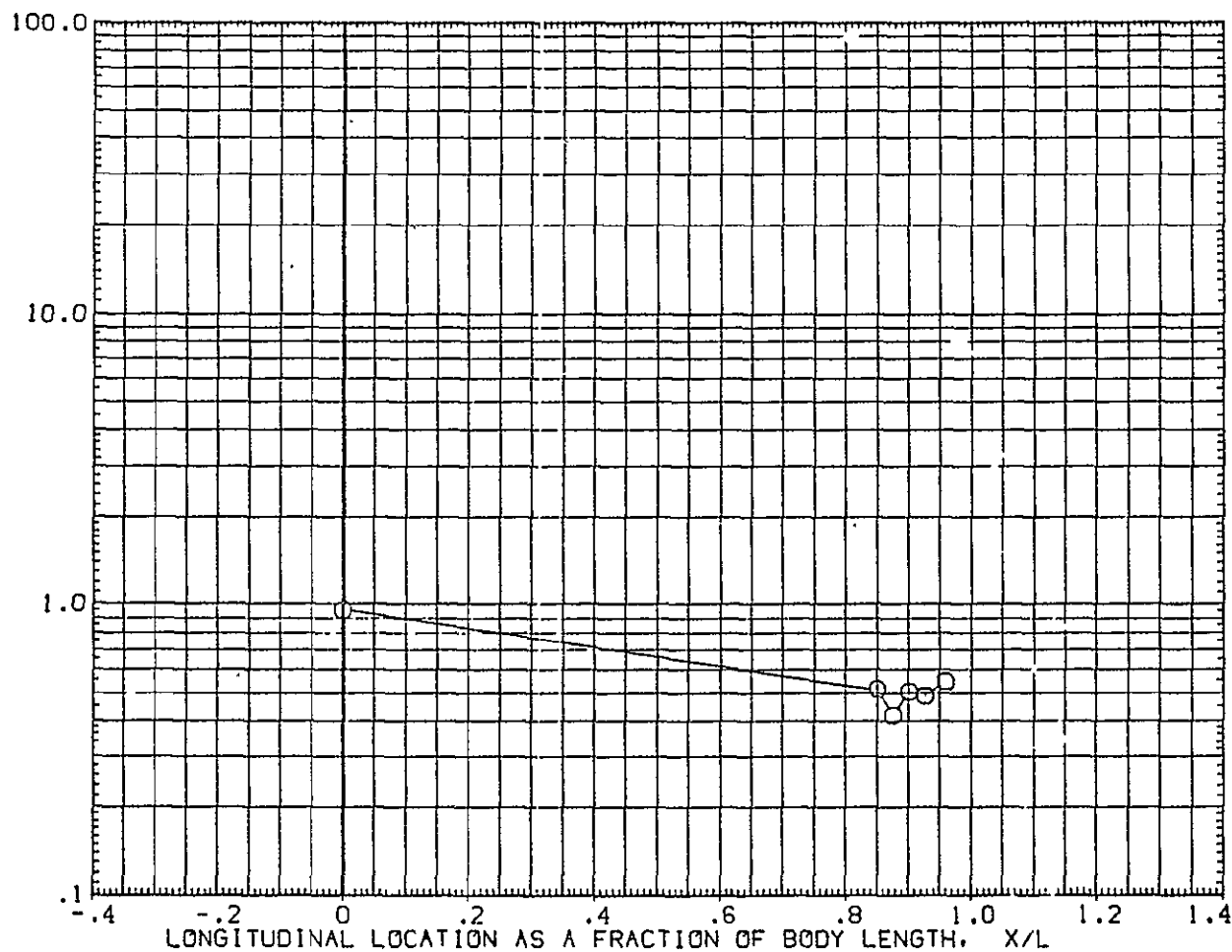


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

CH12 + IH21 MODEL 37 OT(05)/T(01) TANK (IUGT05)

SYMBOL
O
HAW/HT
.900
PHI
247.000
PACW
18.300

PARAMETRIC VALUES
ALPHA
.000
BETA
.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

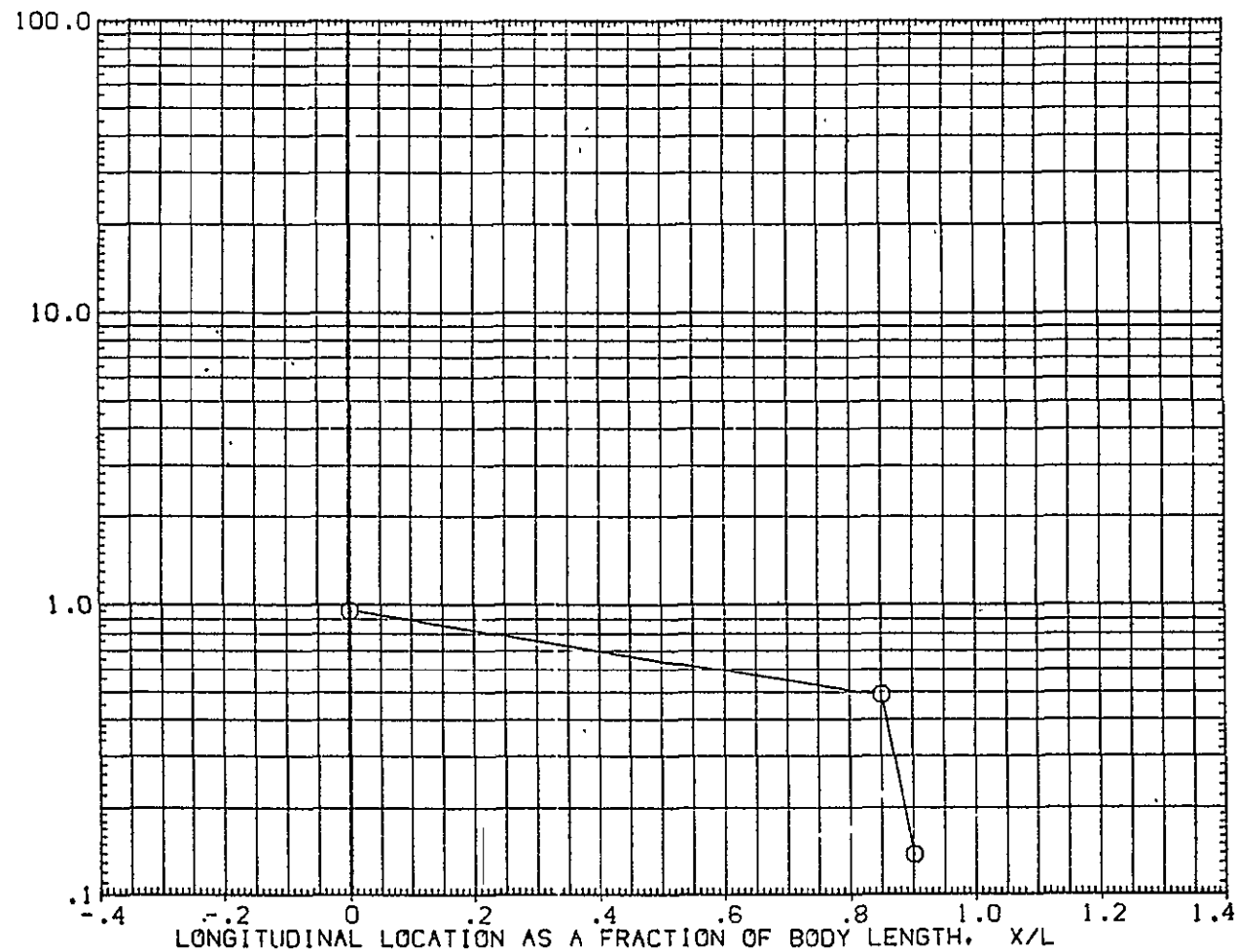


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12 + [H2] MODEL 37 0T(05)/T(0) TANK (1UGT05)

SYMBOL	MAW/HT	PHI	MACH	PARAMETRIC VALUES			
○	.900	270.000	18.300	ALPHA	.000	BETA	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

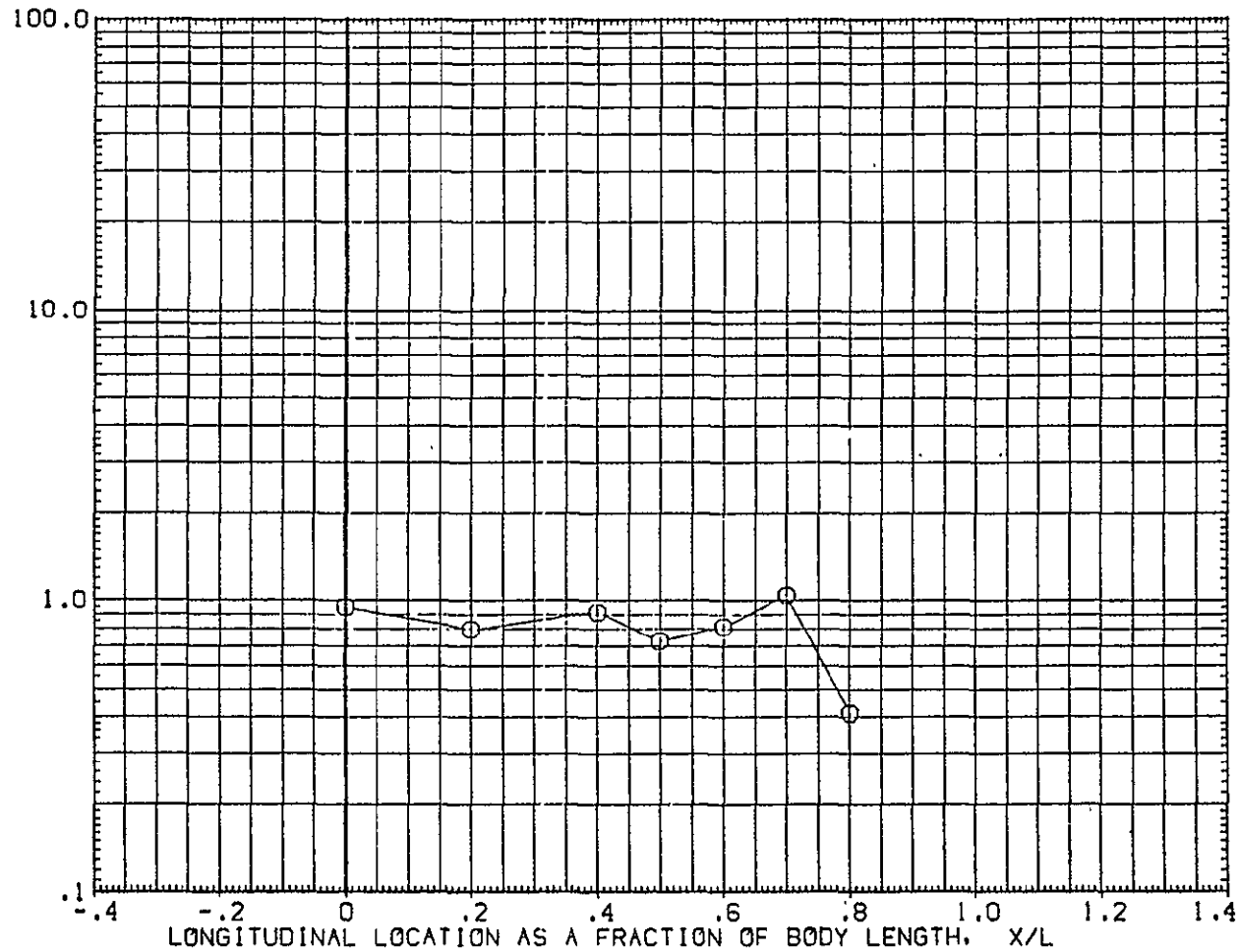


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12 + 1H21 MODEL 37, 0T(05)/T(01) TANK (1UGT05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.900	315.000	18.300		.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

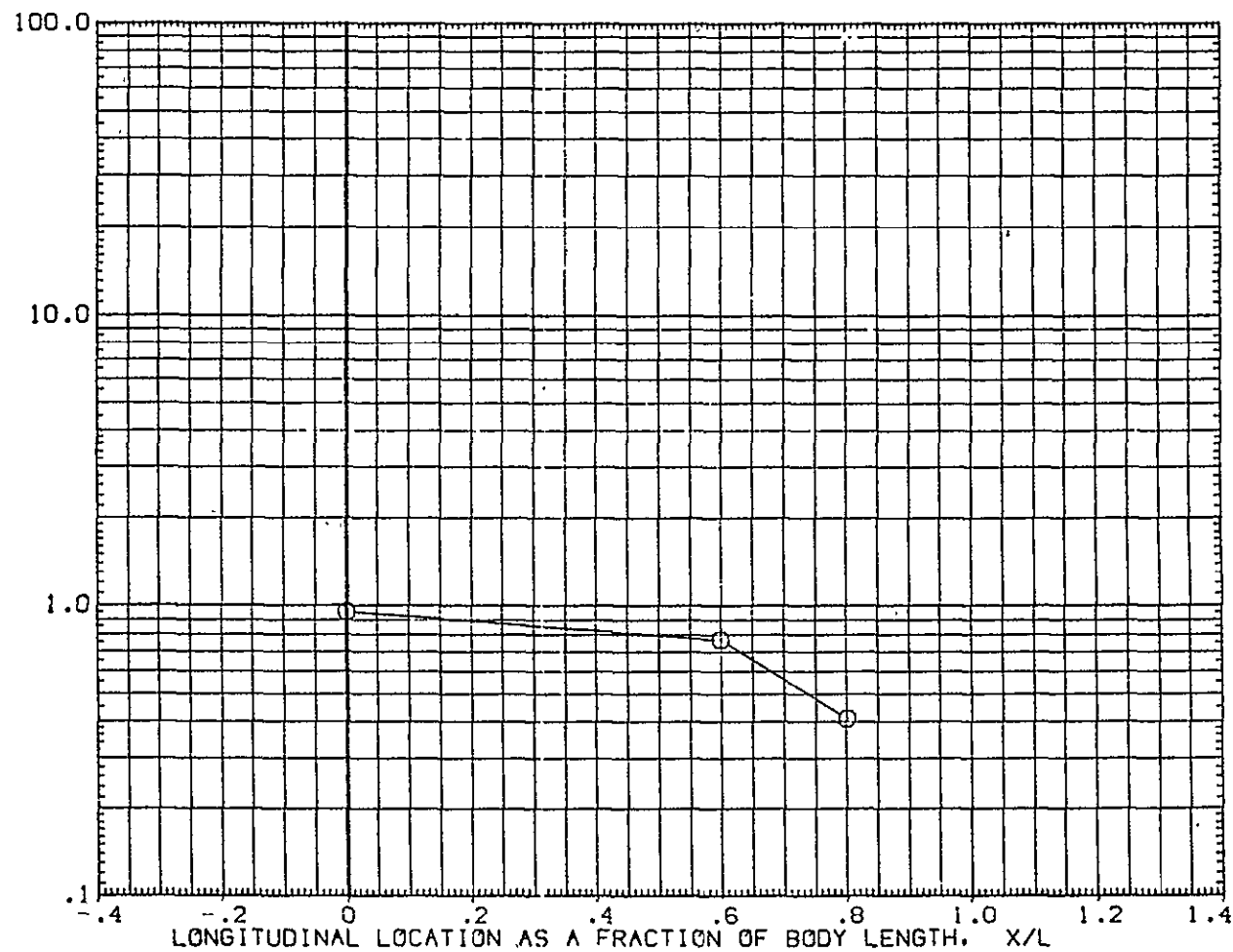


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0H12 + 1H21 MODEL 37 0T(05)/T(01) TANK (1UGT05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	
○	.900	.000	19.180		.000		.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

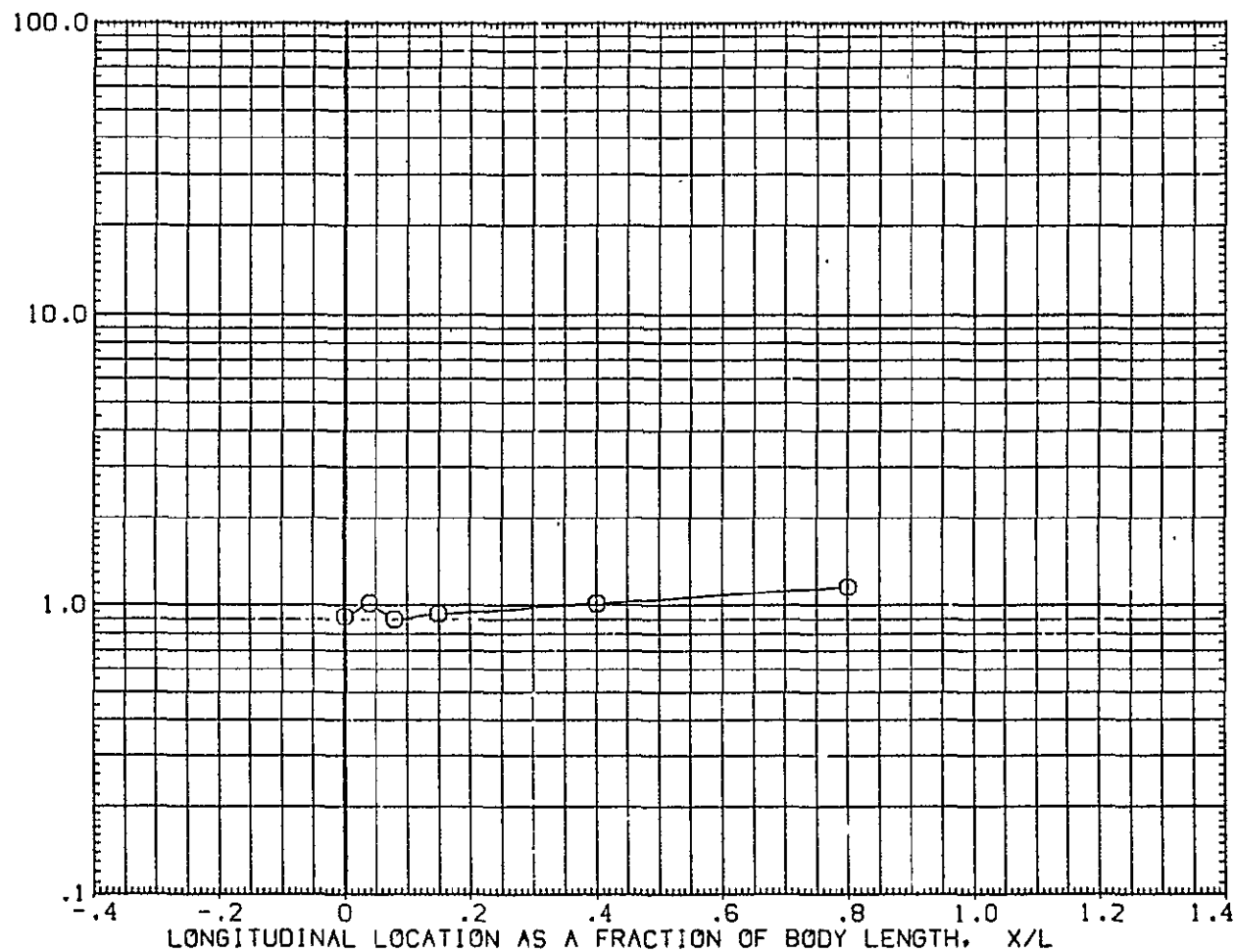


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, h_i/h_u

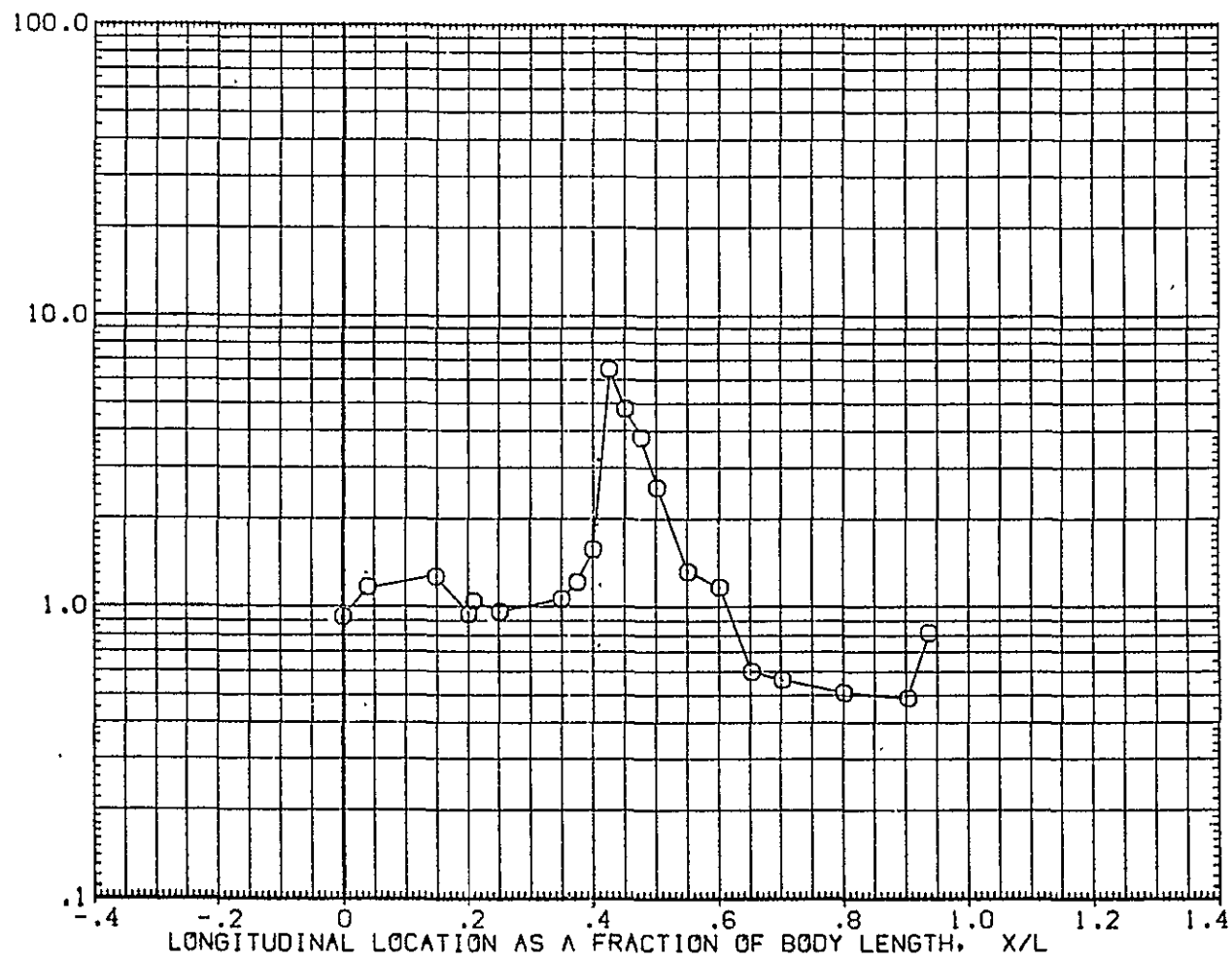


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/L $\alpha = 0$

0H12 + 1H21 MODEL 37 OT(05)/T(01) TANK (1UGT05)

SYMBOL	MAY/HT	PHI	MACH	PARAMETRIC VALUES		
○	.900	199.000	19.180	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

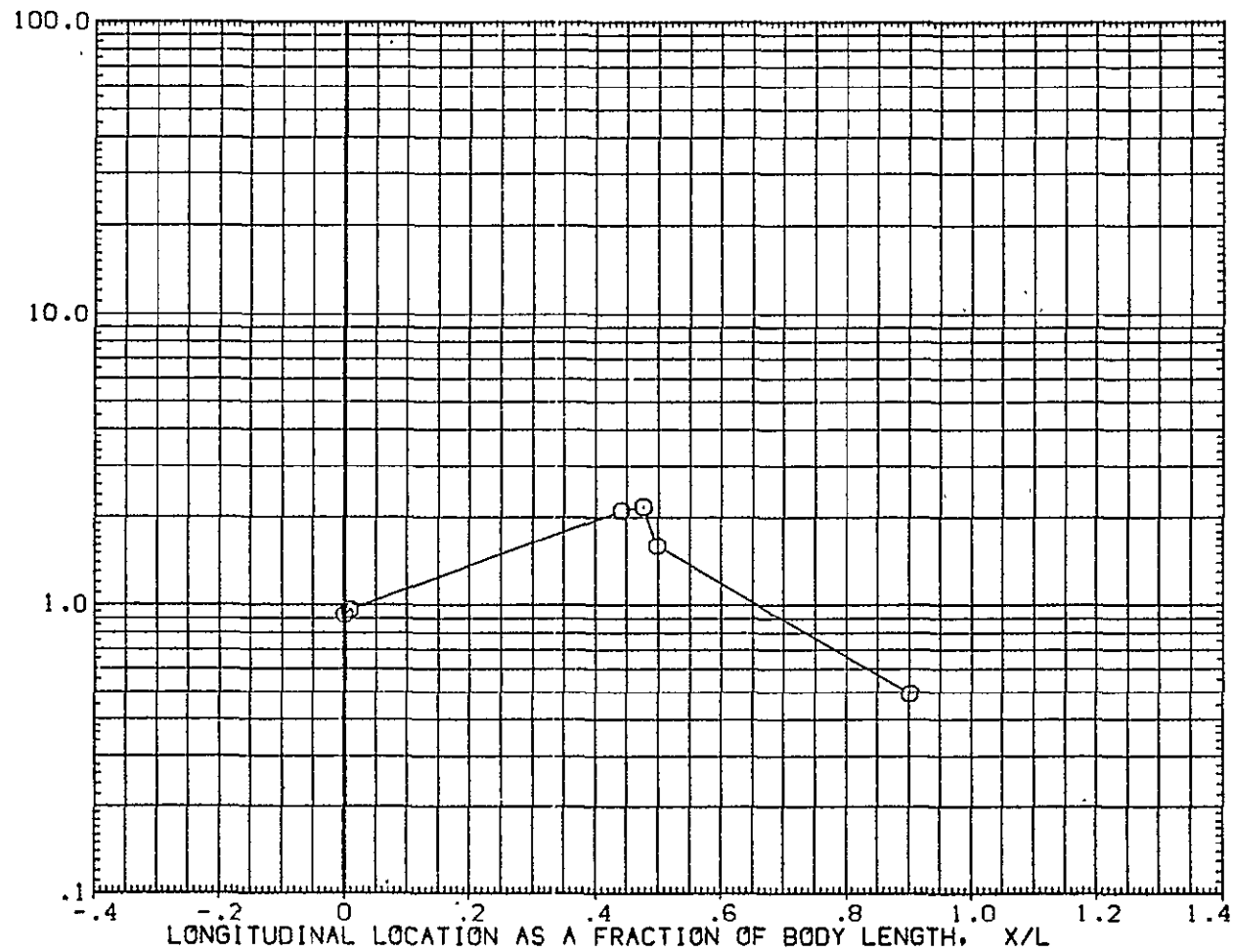


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/T(01) TANK (IUGT05)

SYMBOL
O
HAW/HT .900
PHI 221.000
MACH 19.180

PARAMETRIC VALUES
ALPHA .000
BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_1/H_U

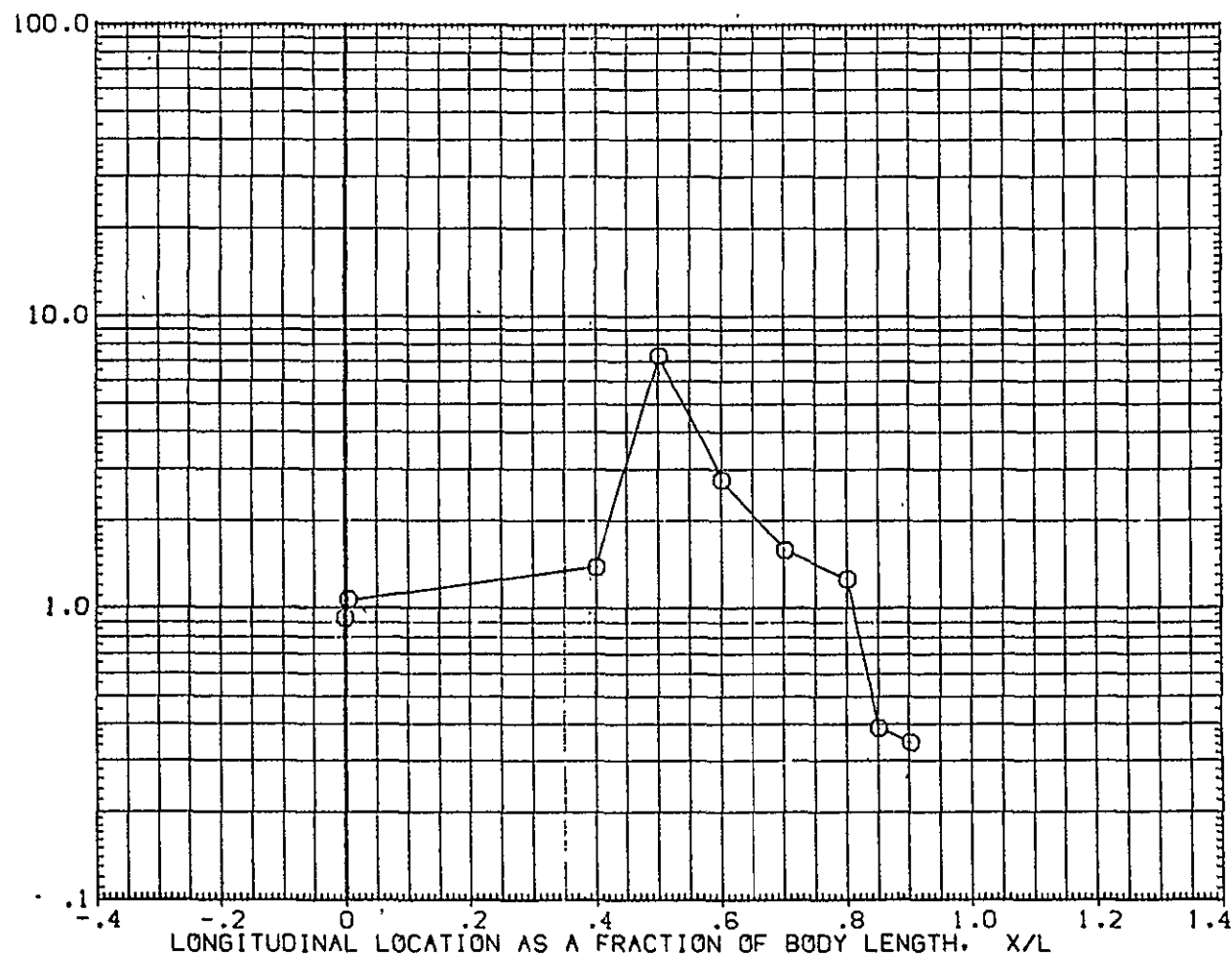


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/L_1 ALPHA = 0

0H12 + IH21 MODEL 37 0T(05)/T(01) TANK (IUGT05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.900	241.000	19.190	.000	BETA	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

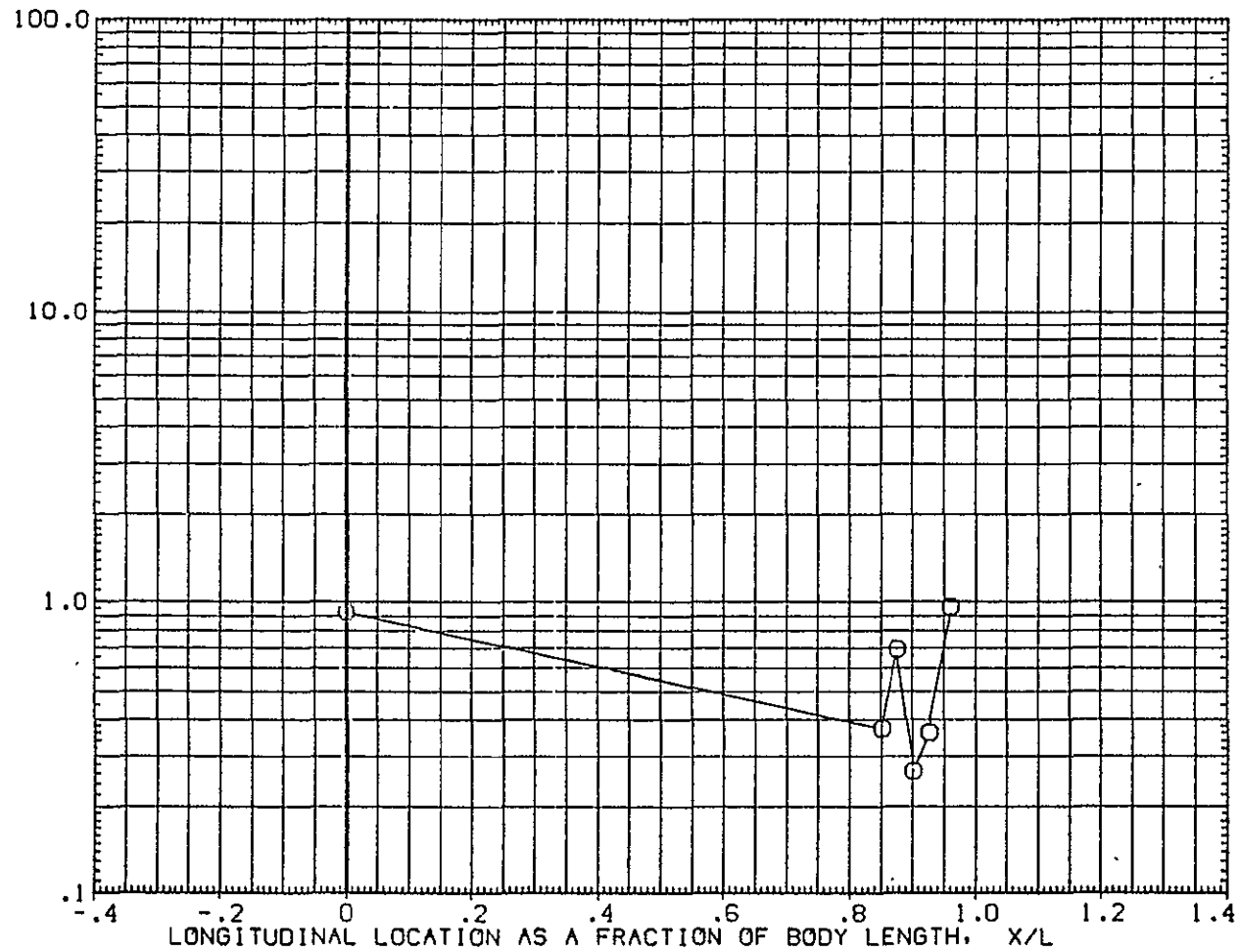


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

0412 + 1H21 MODEL 37 0T(05)/T(01) TANK (1UGT05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA
○	.900	247.000	19.180	.000	.000	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, h_i/h_u

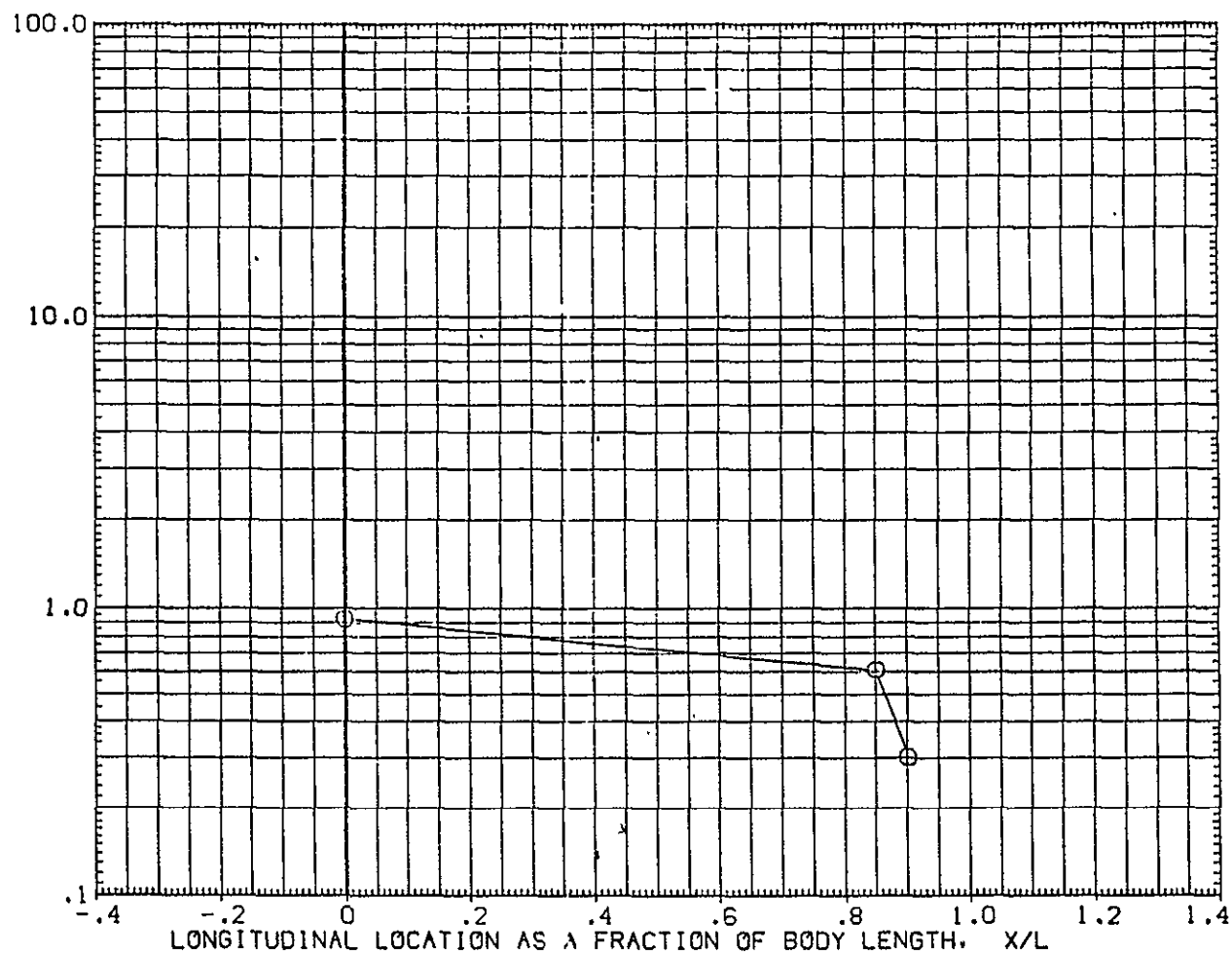


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/T(01) TANK (IUGT05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES
O	.900	270.000	19.180	ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

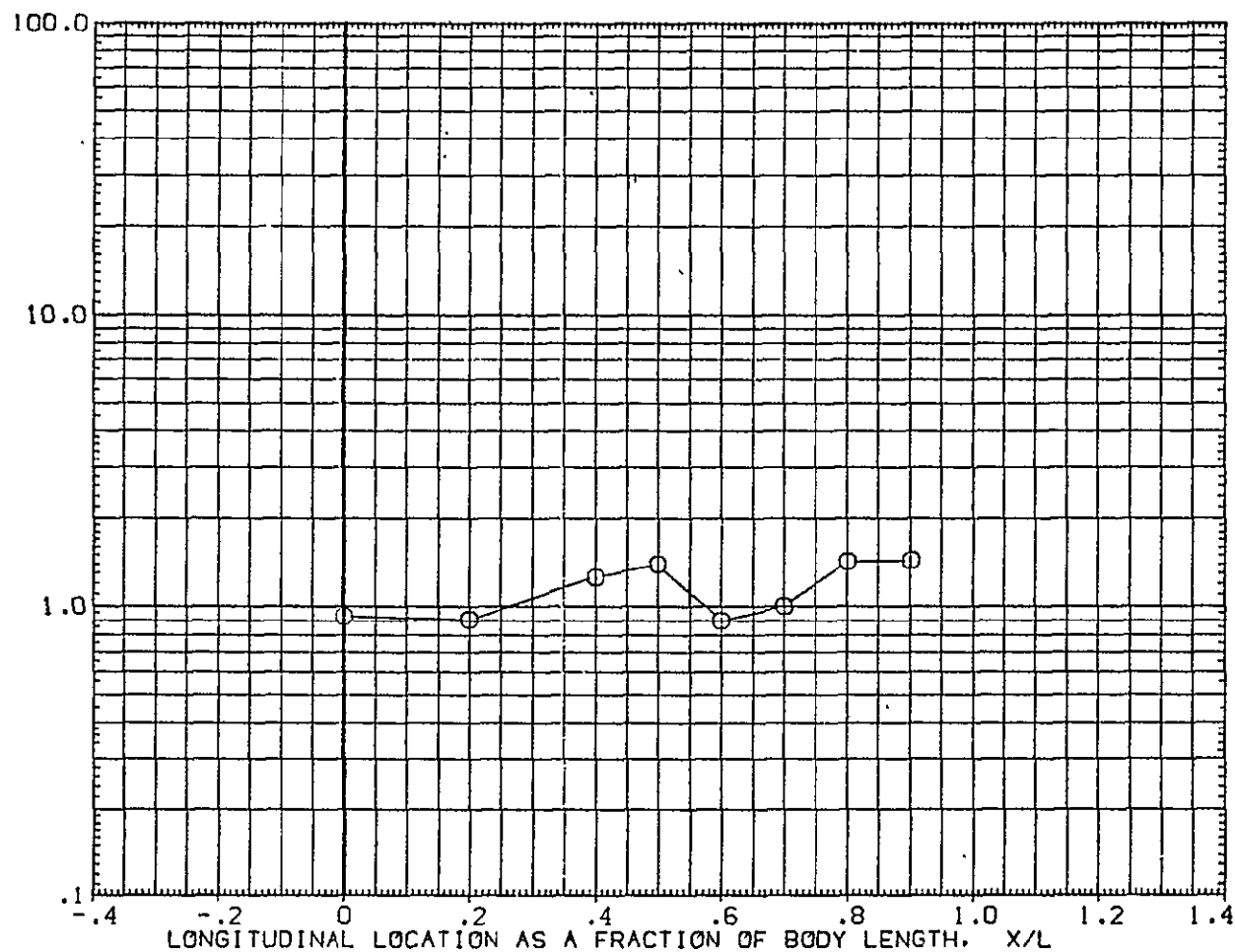


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$, ALPHA = 0

0H12 + IH21 MODEL 37 0T(05)/T(01) TANK (IUGT05)

SYMBOL	HAW/HT	P41	MACH	PARAMETRIC VALUES		
○	.900	315.000	19.180	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

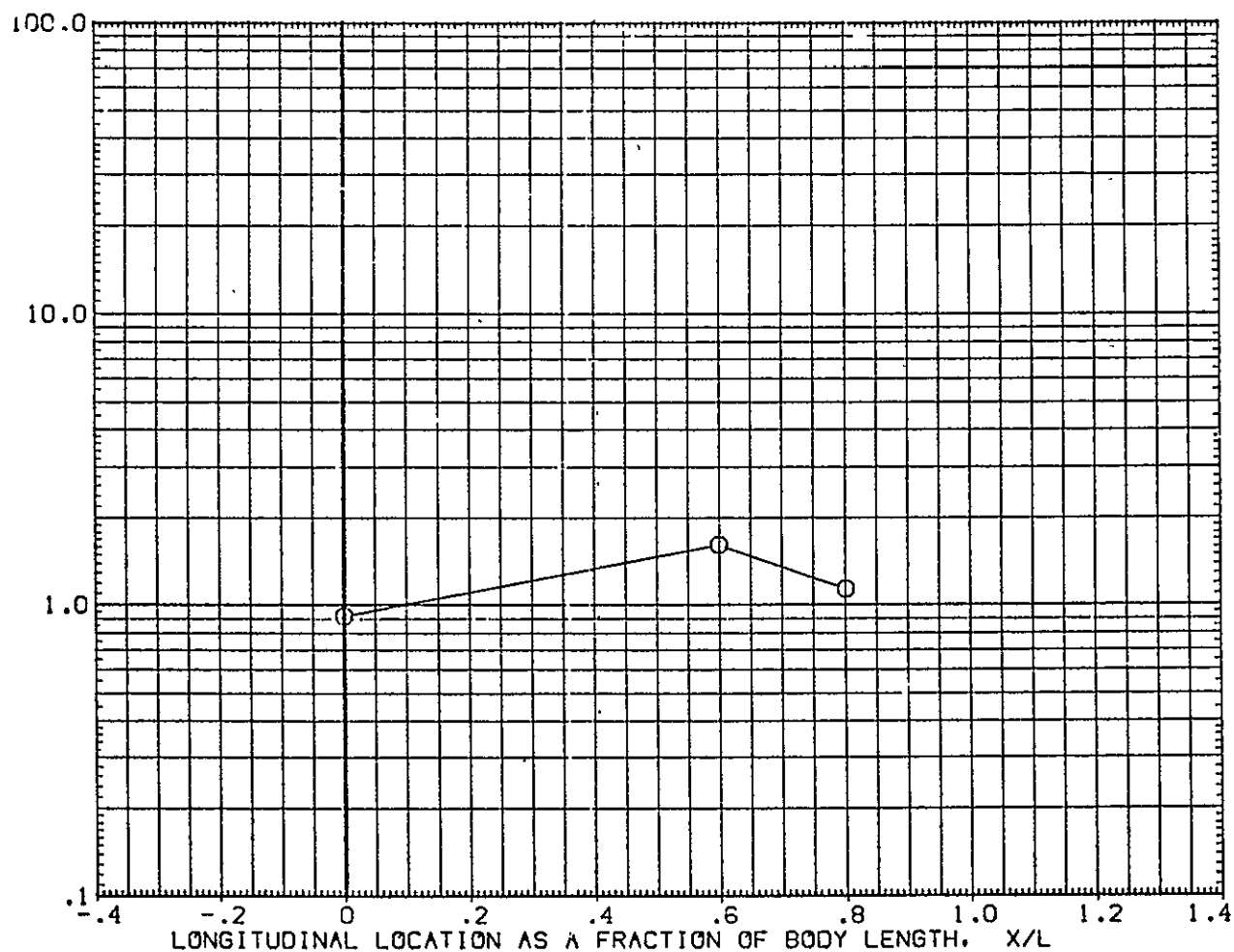


FIG. 4 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L1$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 T TANK (RUGT02)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	.000	19.170	ALPHA	5.000	BETA
□	.900					.000
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

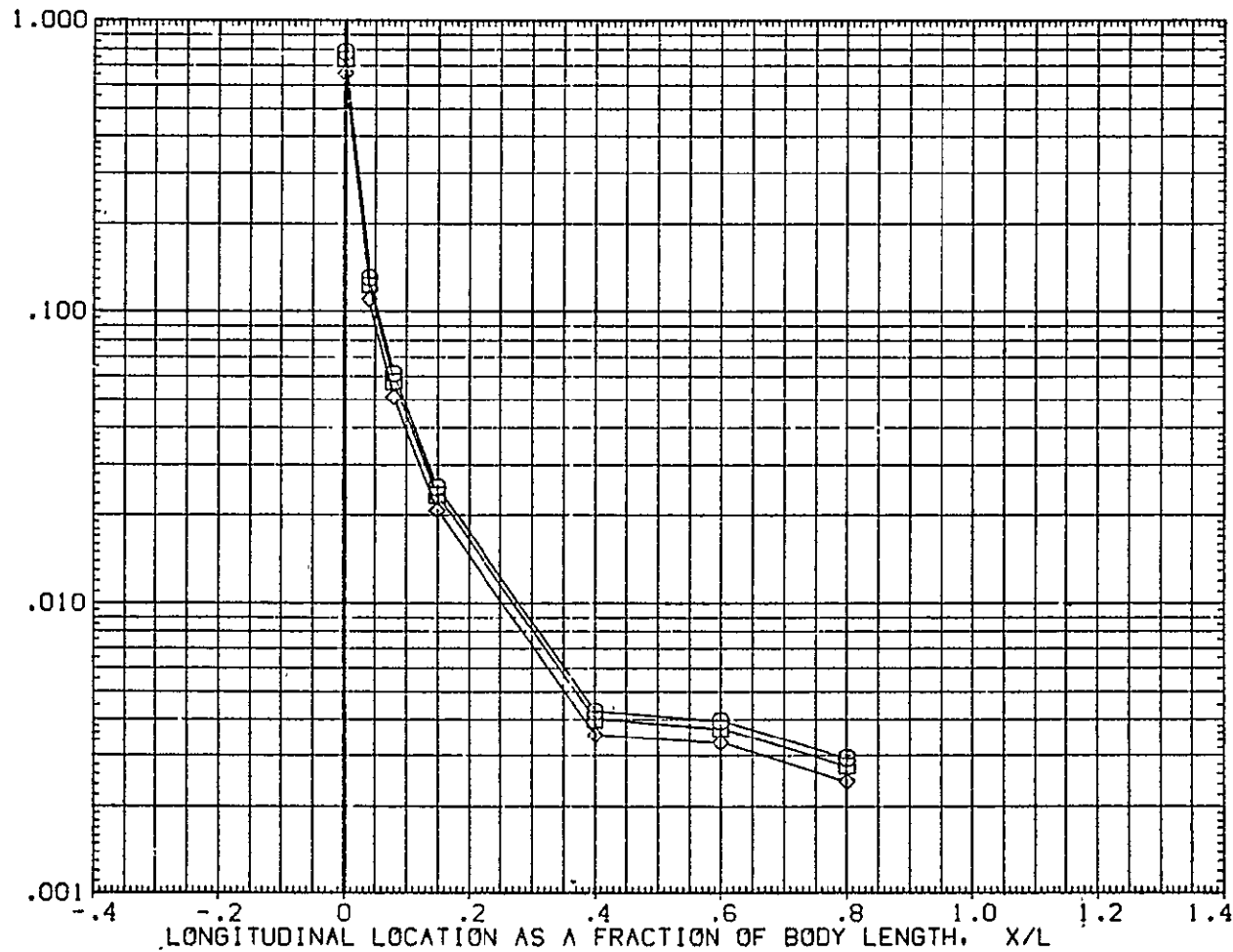


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER, ALPHA = 5

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SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	180.000	19.170	ALPHA	5.000	BETA
□	.900					.000
◇	1.000					

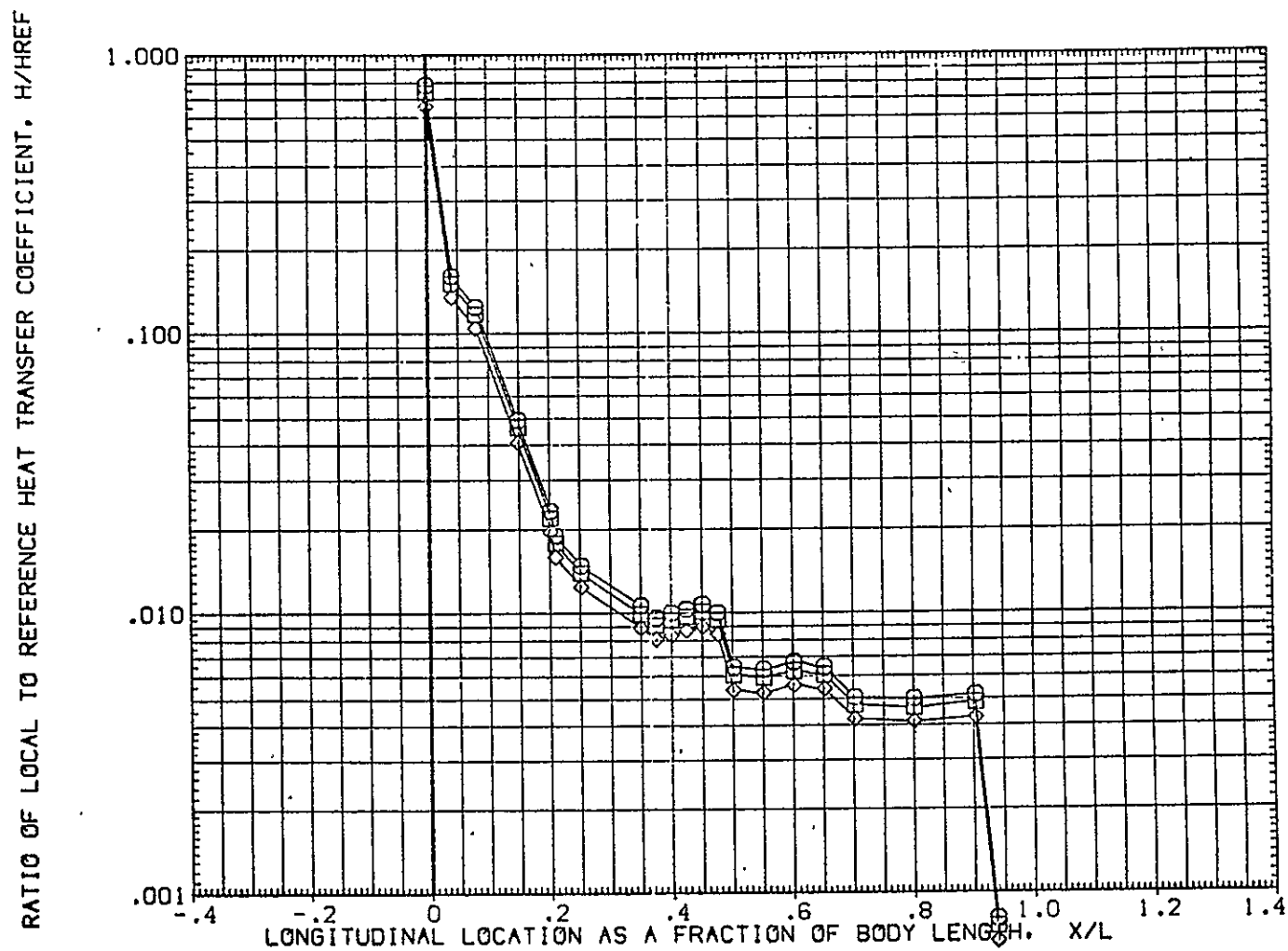


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

0H12/IH21 (CAL HST 173-100) 37 T

TANK

(RUGT02)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	199.000	19.170	ALPHA	5.000	BETA .000
□	.900					
◇	1.000					

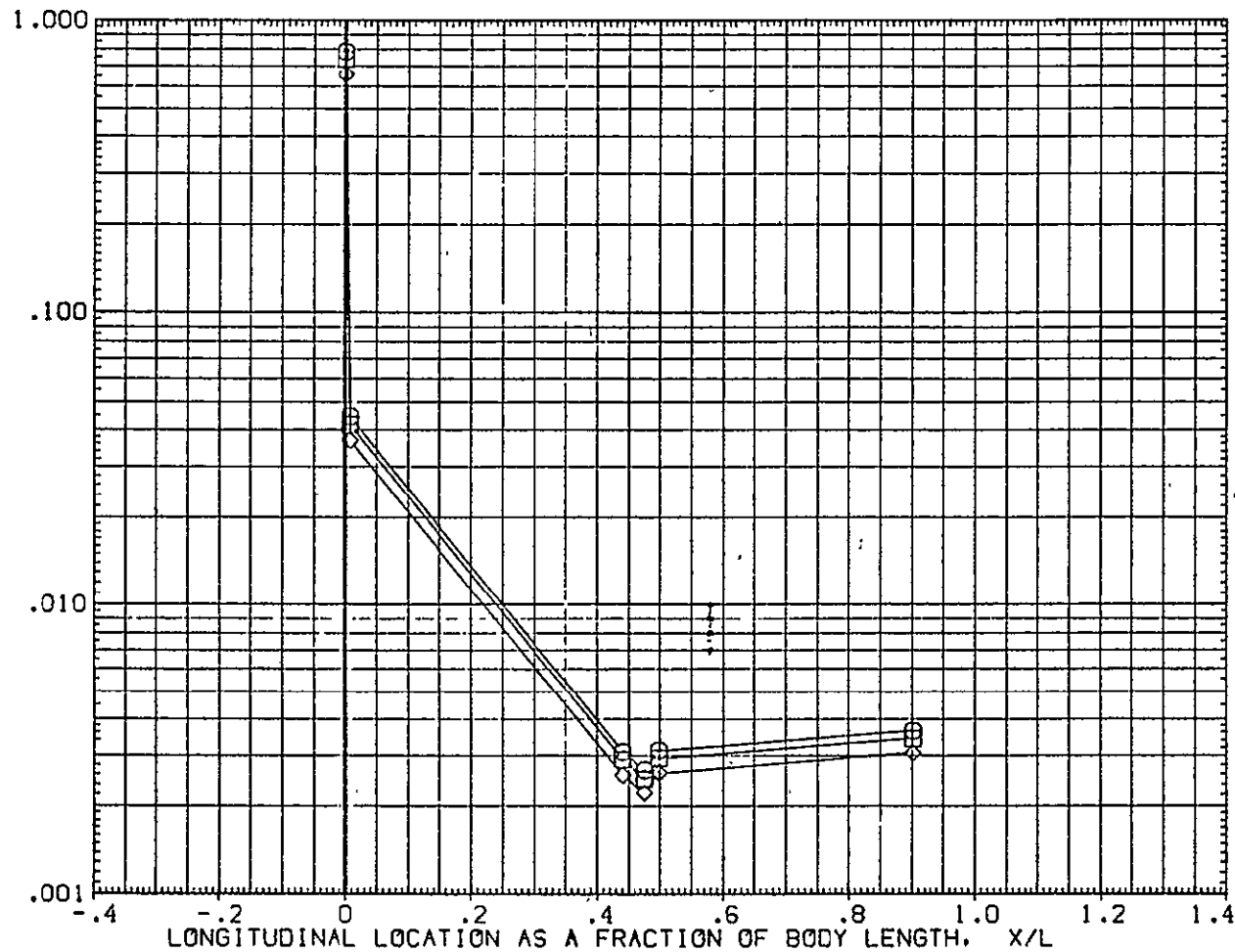
RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} 

FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

OH12/IH21 (CAL HST 173-100) 37 T TANK (RUGT02)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
◇	.850	221.000	19.170	ALPHA	5.000	BETA .000
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/HREF

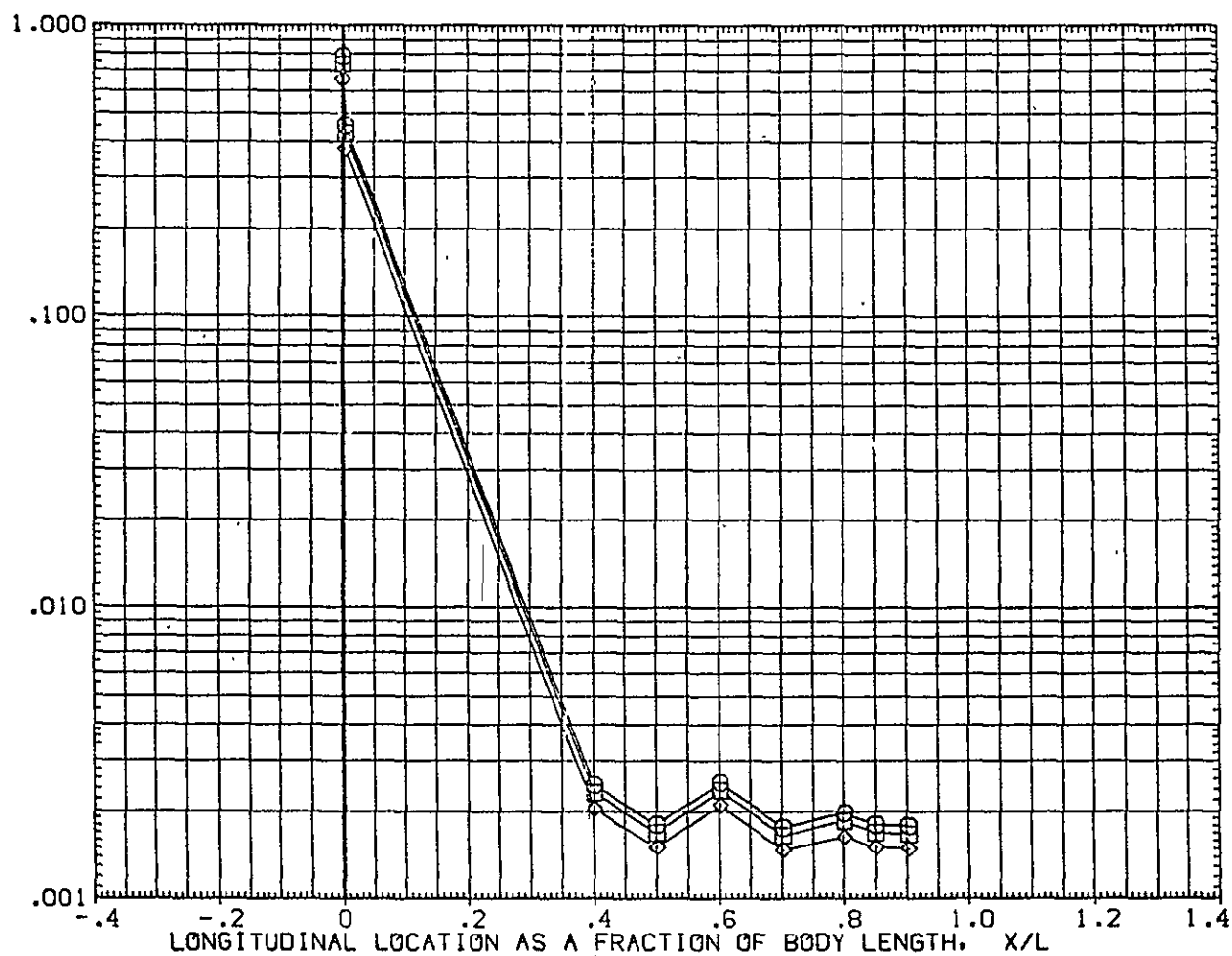


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

OH12/IH21 (CAL HST 173-100) 37 T

TANK (RUGT02)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	
○	.850	241.000	19.170	5.000			.000
□	.900						
◇	1.000						

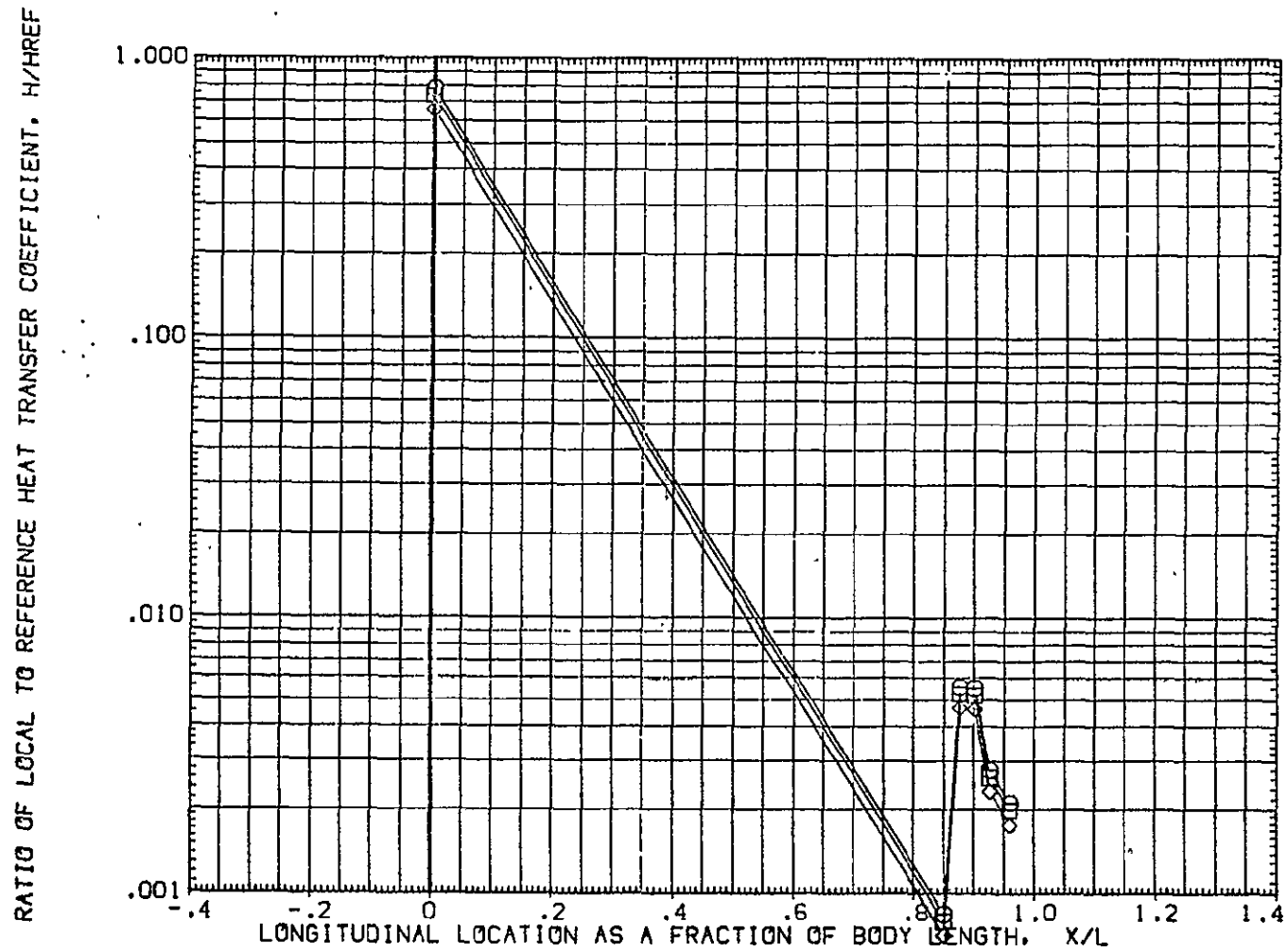


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

0H12/1H21 (CAL HST 173-100) 37 T TANK (RUST02)

SYMBOL	MAW/HT	PHI	MACH	PARAMETRIC VALUES		
	.850	247.000	19.170	ALPHA	5.000	BETA
	.900					.000
	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

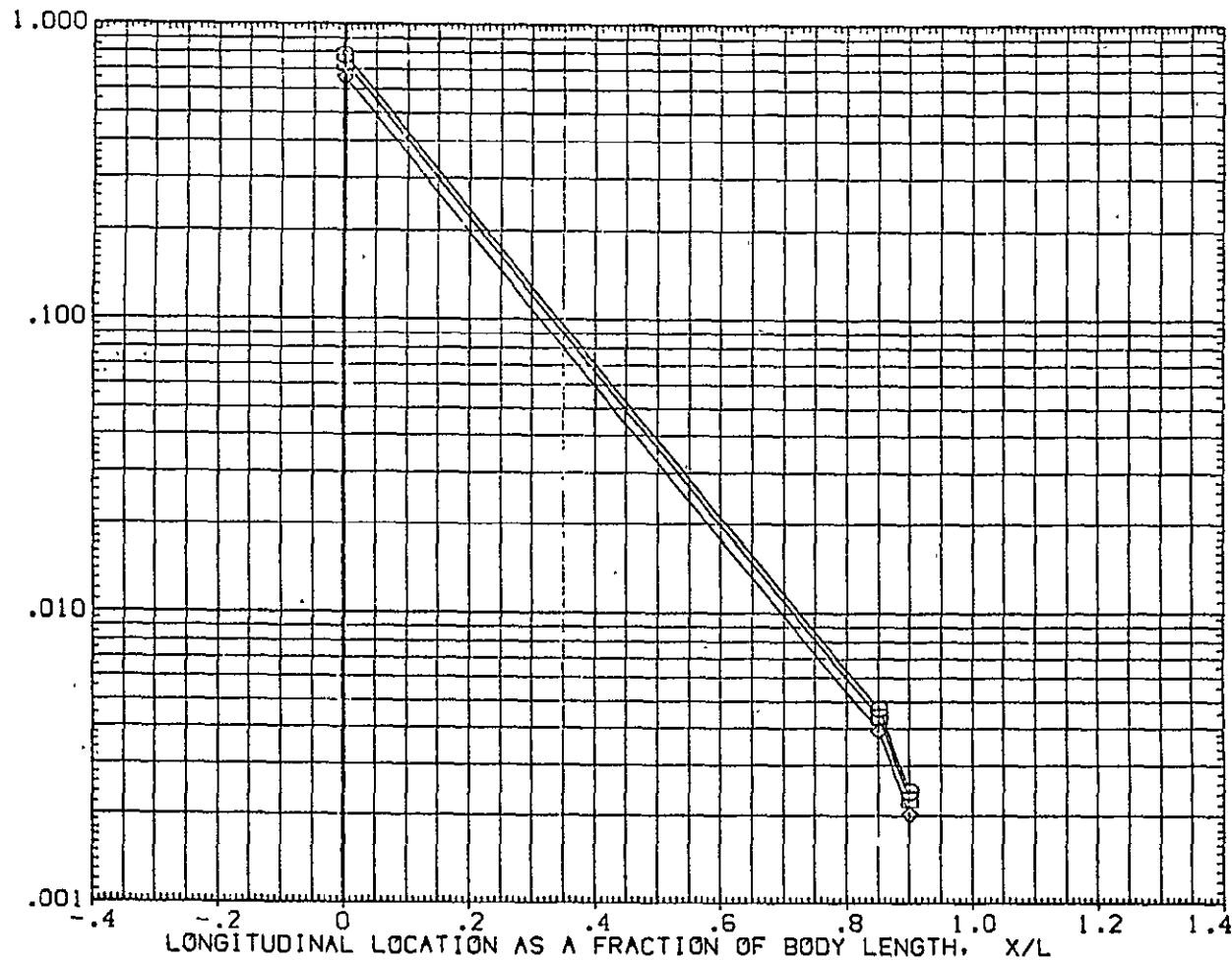


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

OH12/IH21 (CAL HST 173-100) 3' T TANK (RUGT02)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	.000
○	.850	270.000	19.170				
□	.900						
◇	1.000						

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

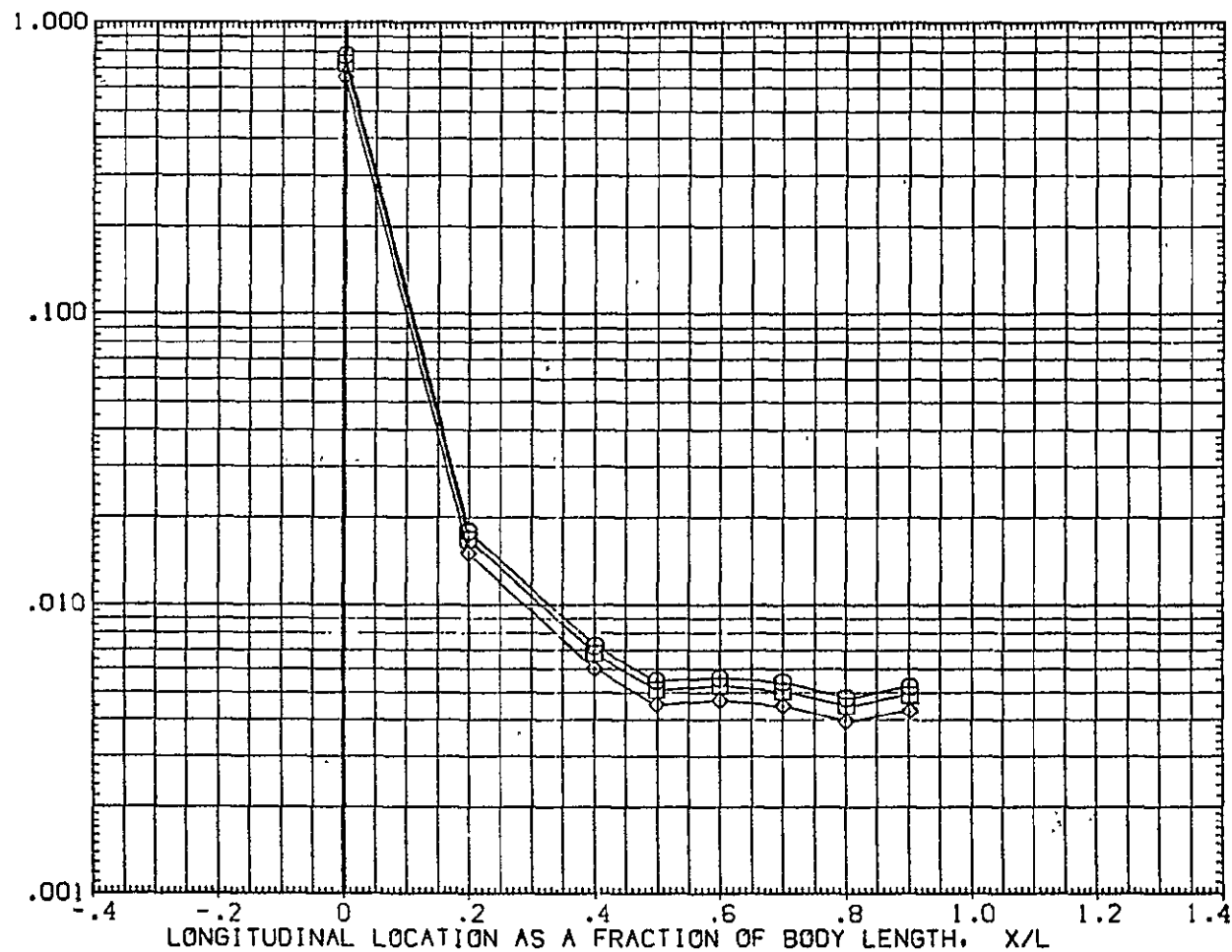


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

0H12/IH21 (CAL HST I73-100) 37 T TANK (RUGT02)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES		BETA	
□	.850	315.000	19.170	5.000			.000	
◇	.900							
	1.000							

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

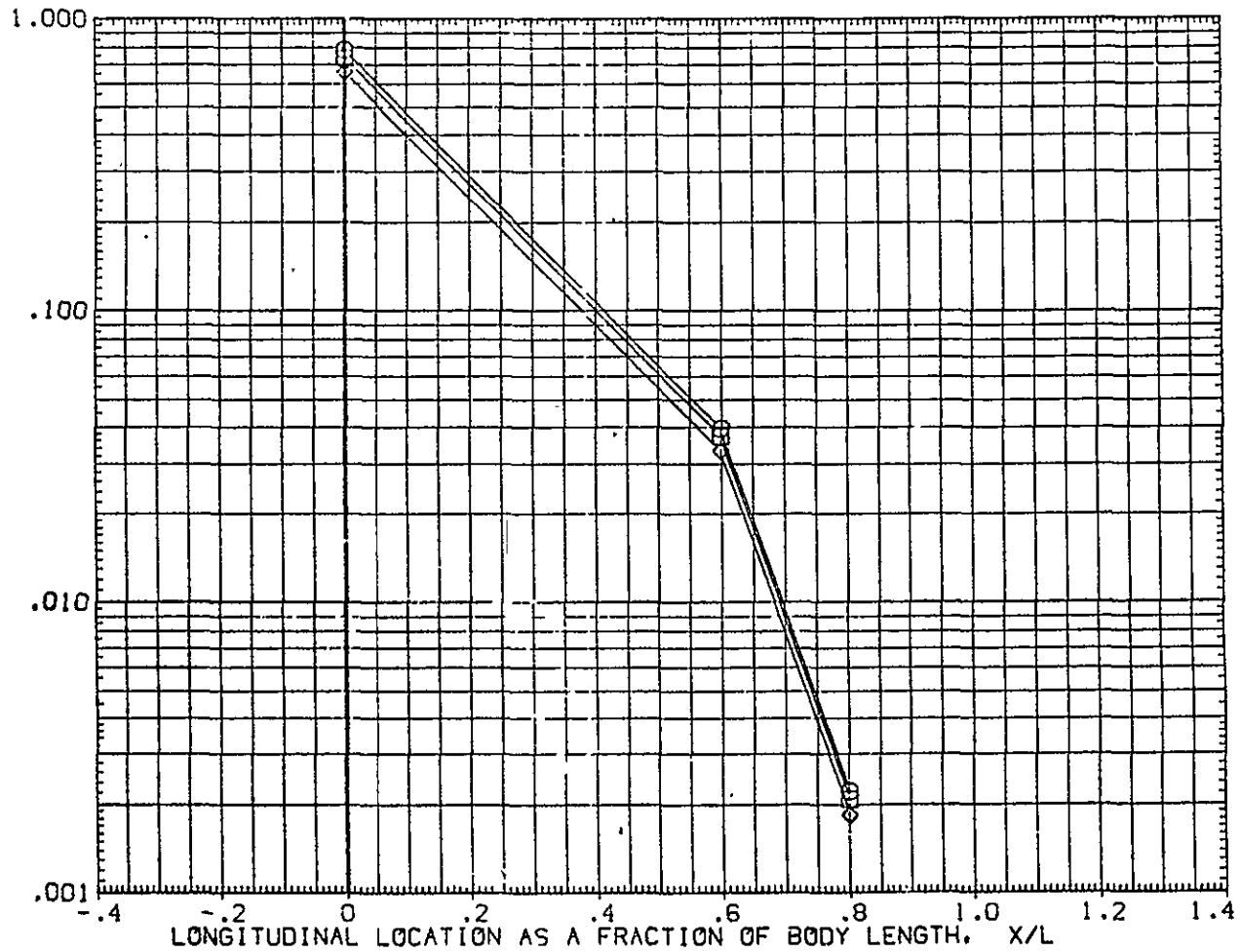


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT06)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	
◇	.850	.000	18.790	5.000		.000	
◇	.900						
◇	1.000						

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

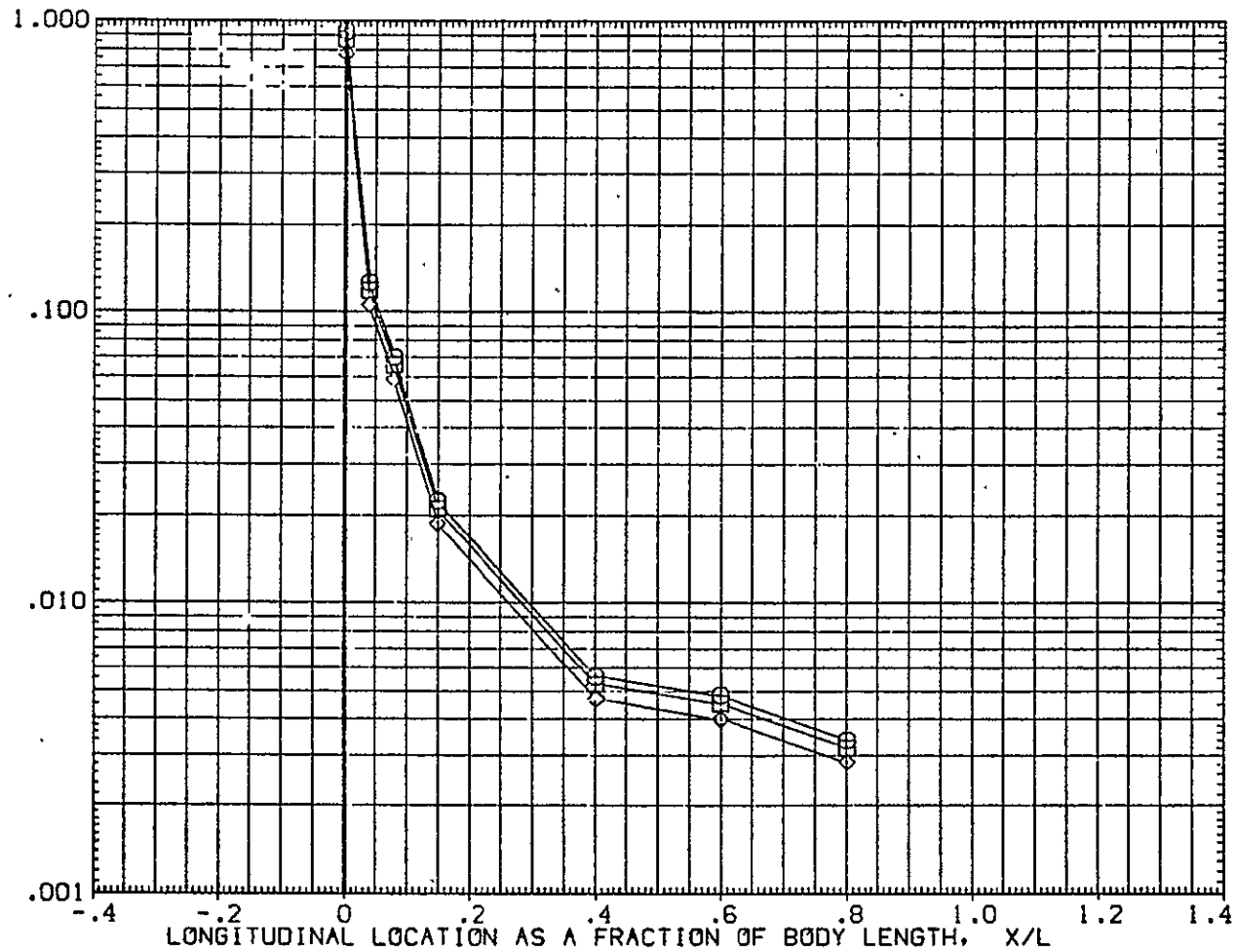


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
◇	.850	180.000	18.790	ALPHA	5.000	BETA
□	.900					
◇	1.000					.000

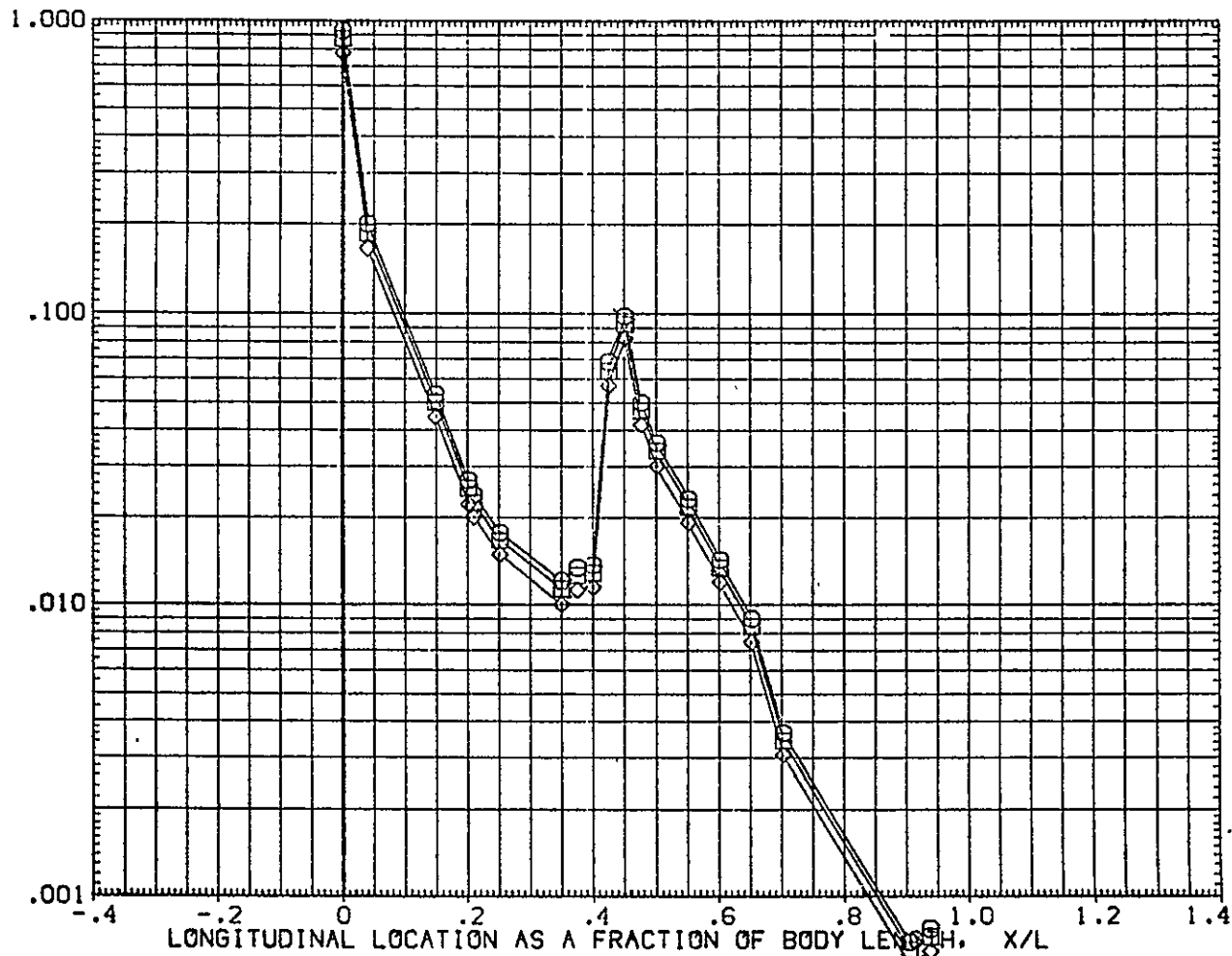
RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} 

FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

0H12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT06)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	199.000	18.790	5.000		.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

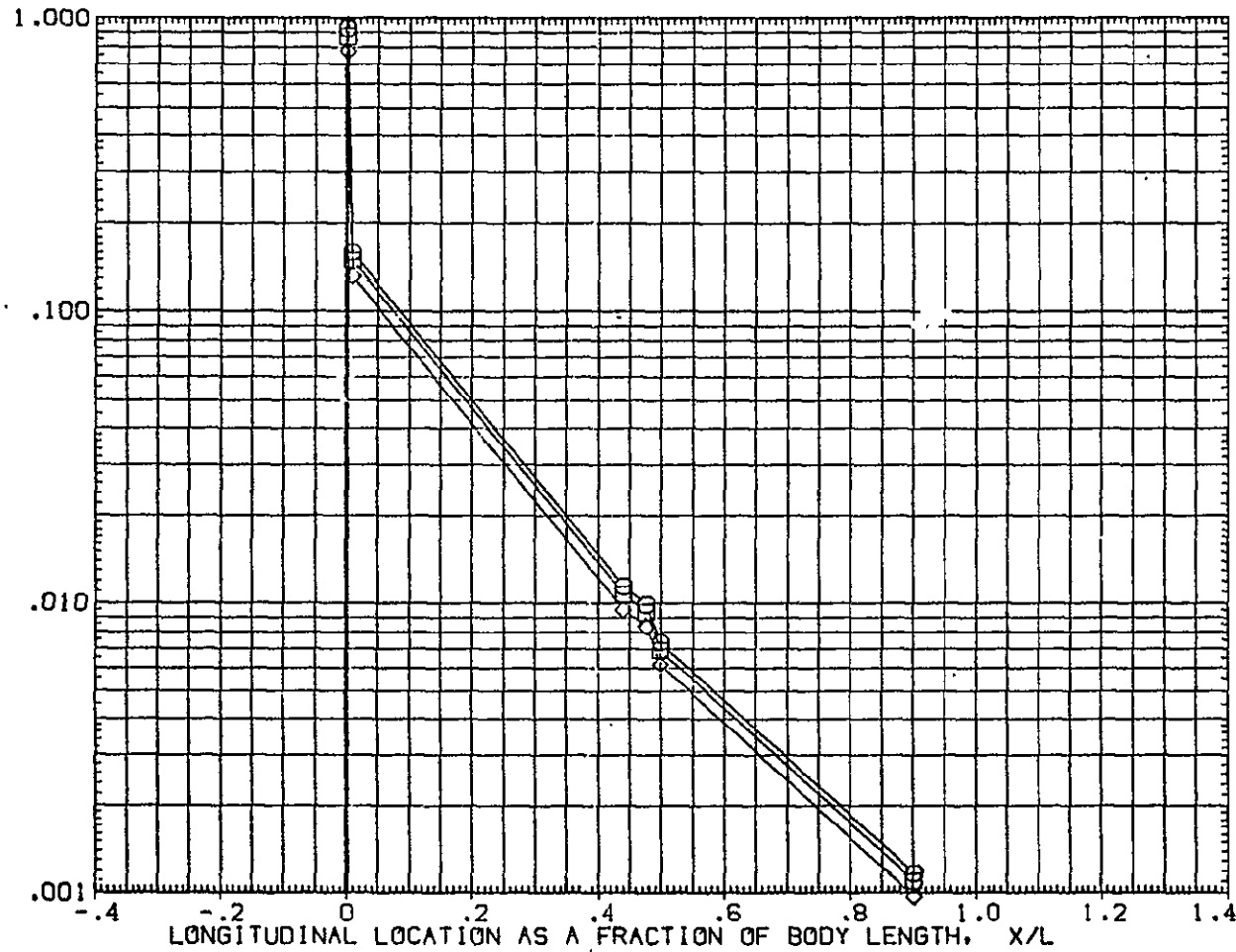


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER $\alpha = 5$

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT06)

SYMBOL	HAM/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	221.000	18.790	5.000		.000
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

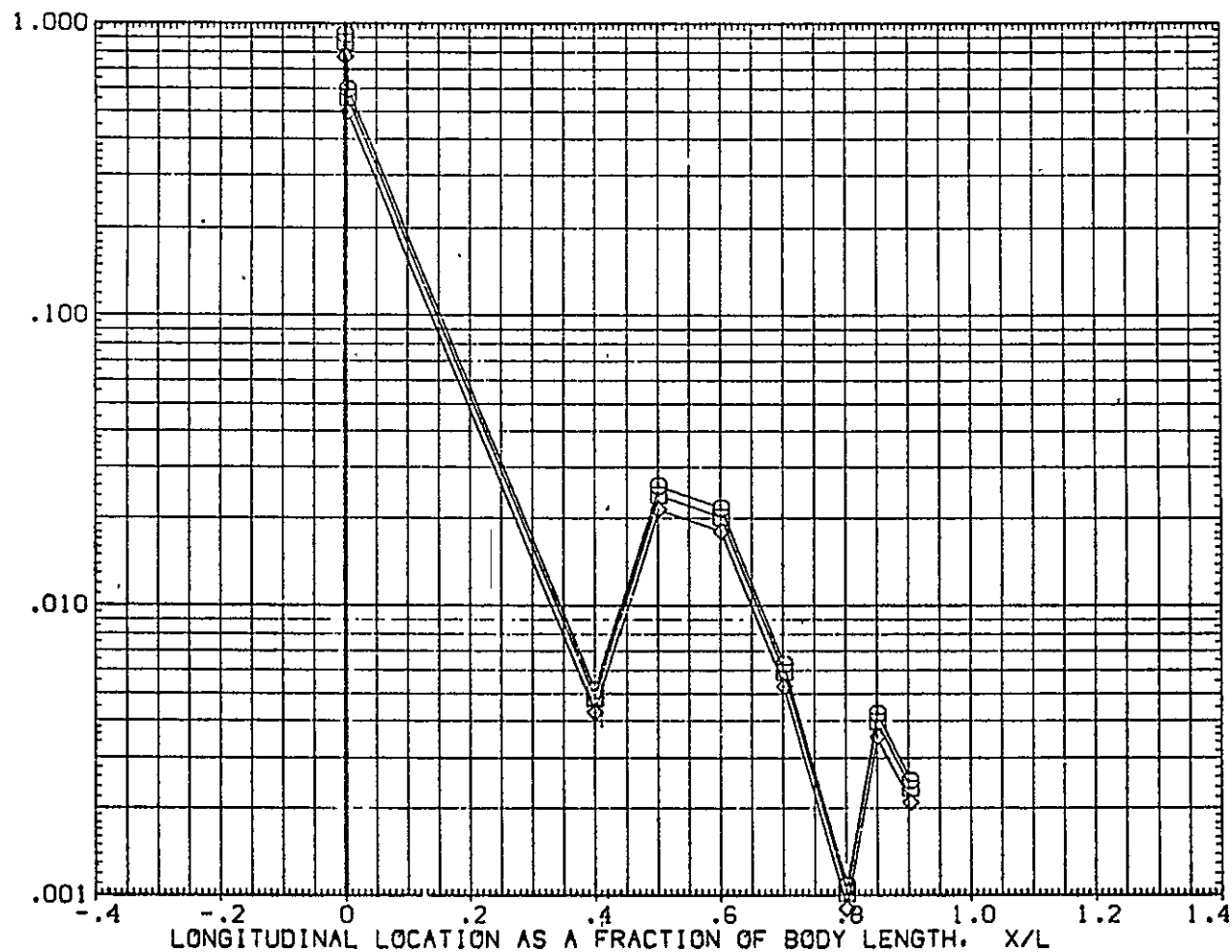


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

GH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT06)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	241.000	18.790	5.000		.000
◇	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

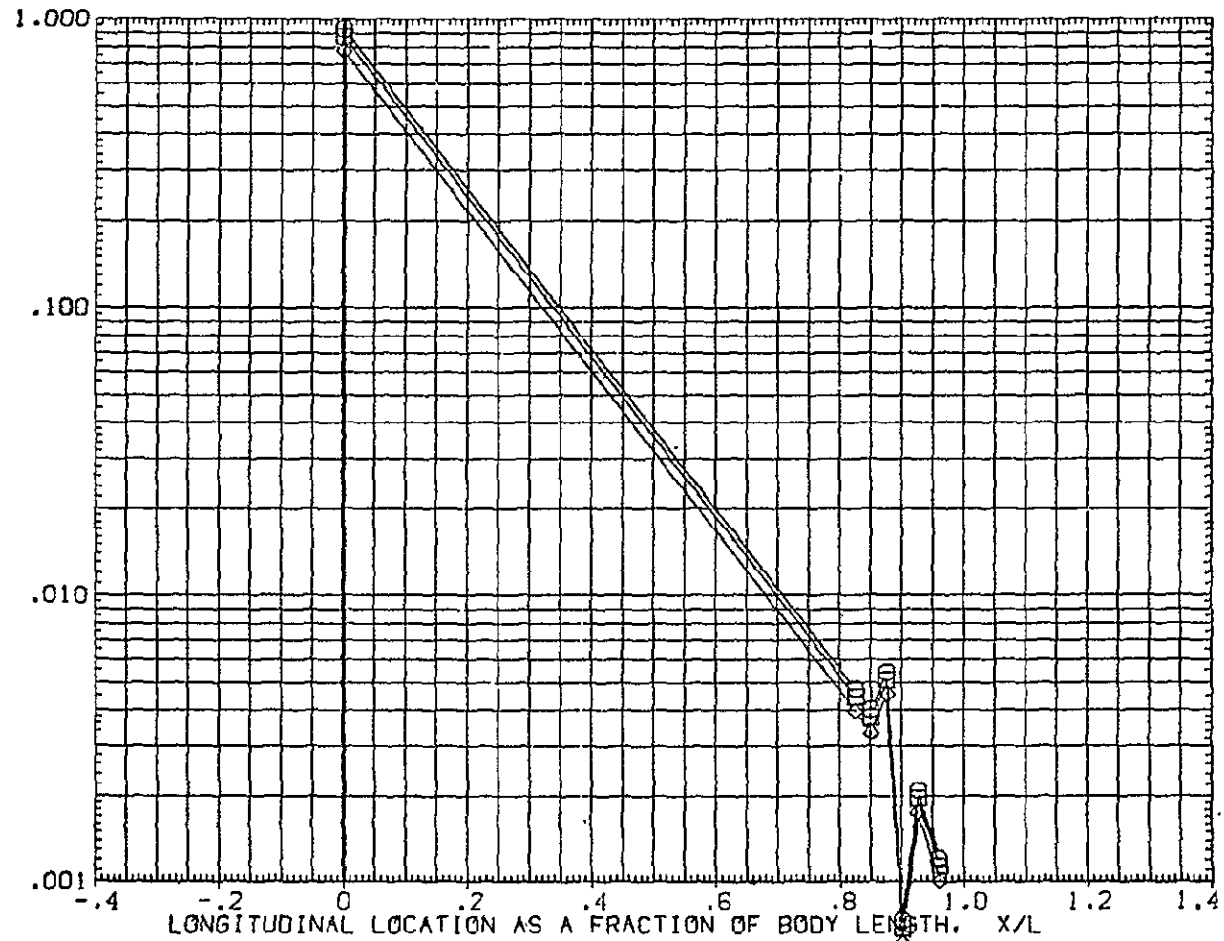


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
◇	.850	247.000	18.790	ALPHA	5.000	BETA .000
□	.900					
◇	1.000					

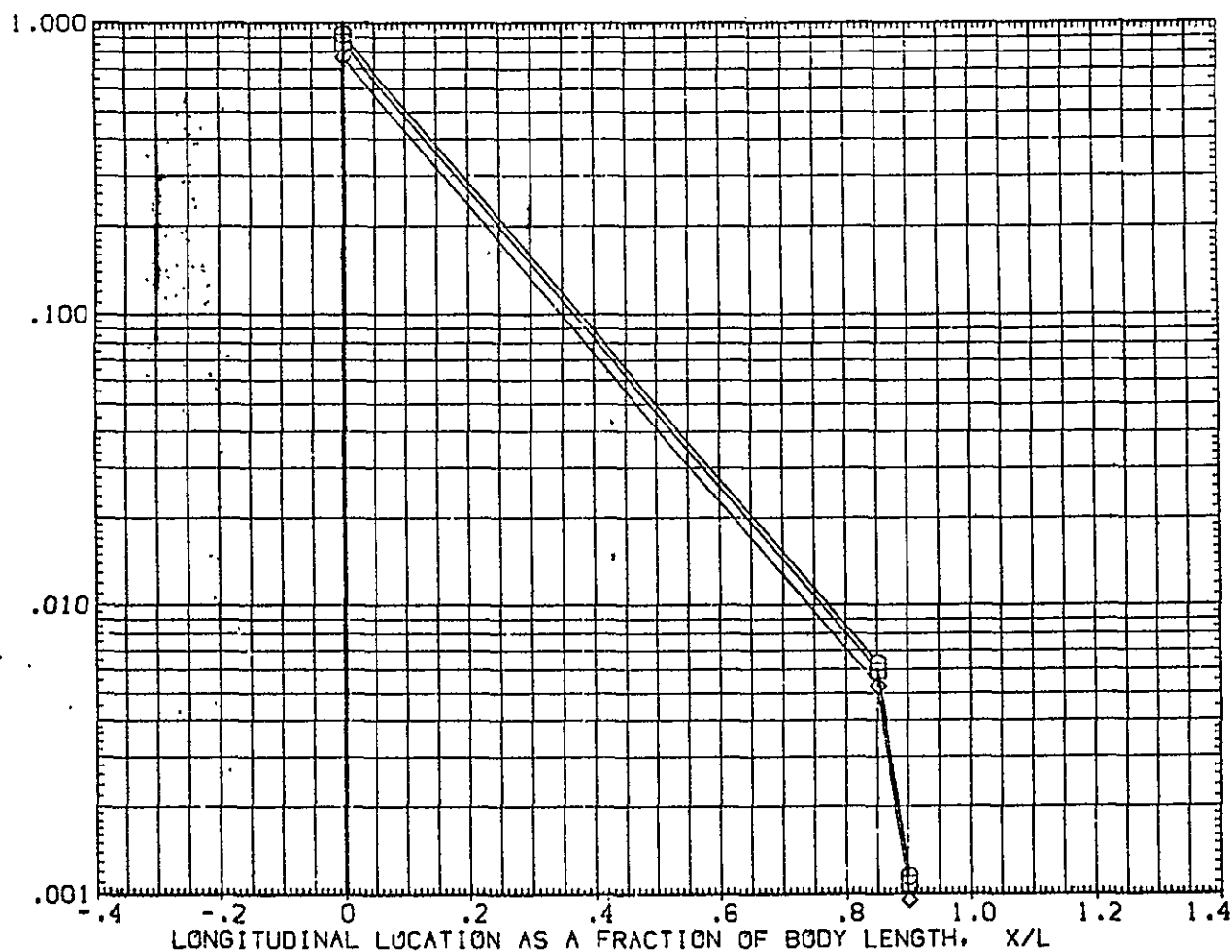
RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} 

FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT06)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	270.000	18.790	ALPHA	5.000	BETA
□	.900					.000
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

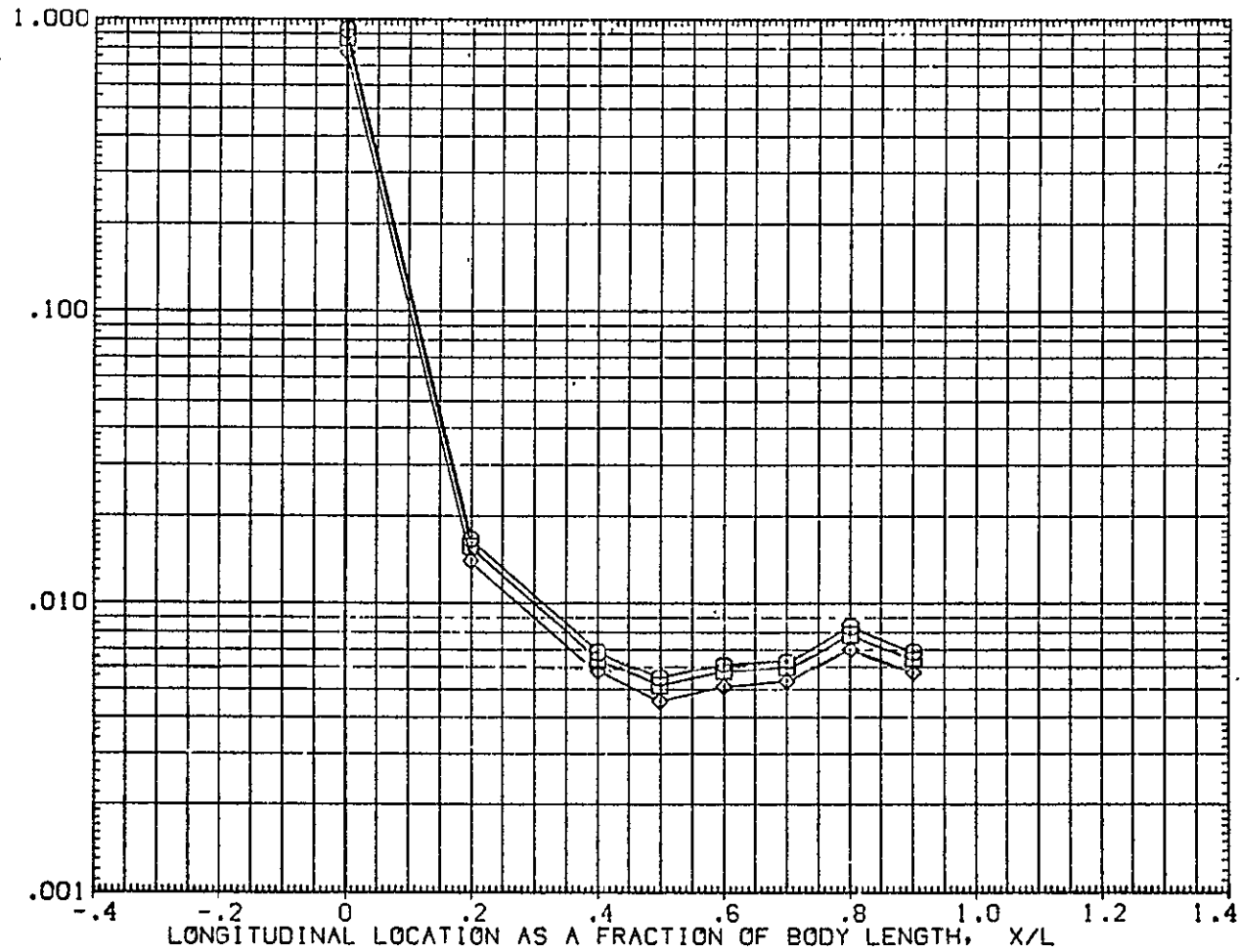


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

OH12/IH21 (CAL HST 173-100) 37 G F TANK (RUGT06)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	
○	.850	315.000	18.790	5.000		.000	
□	.900						
◇	1.000						

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

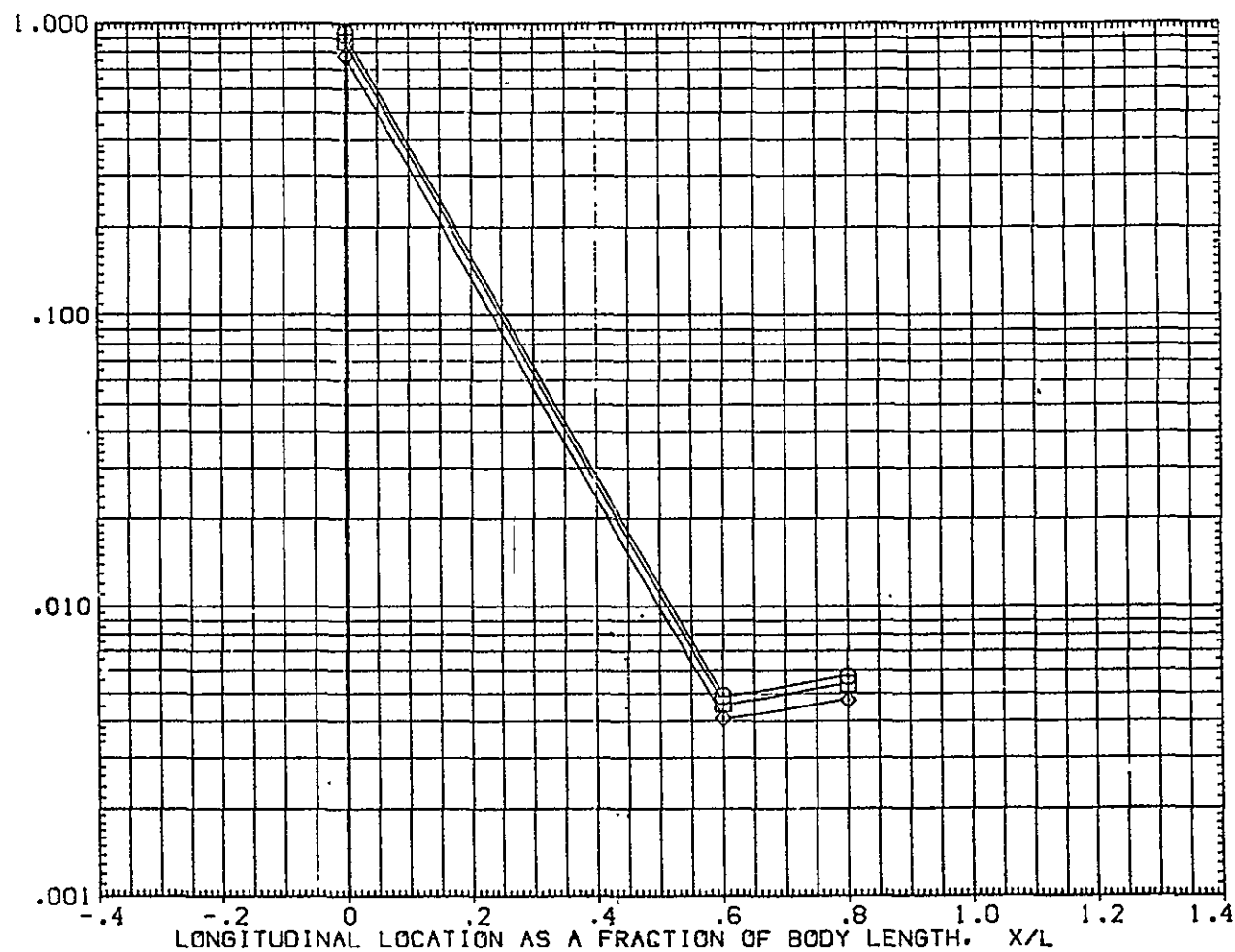


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER $\alpha = 5$

OH12 + IH21 MODEL 37 OT(06)/T(02) TANK (IUGT06)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES
O	.900	.000	18.980	ALPHA 5.000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

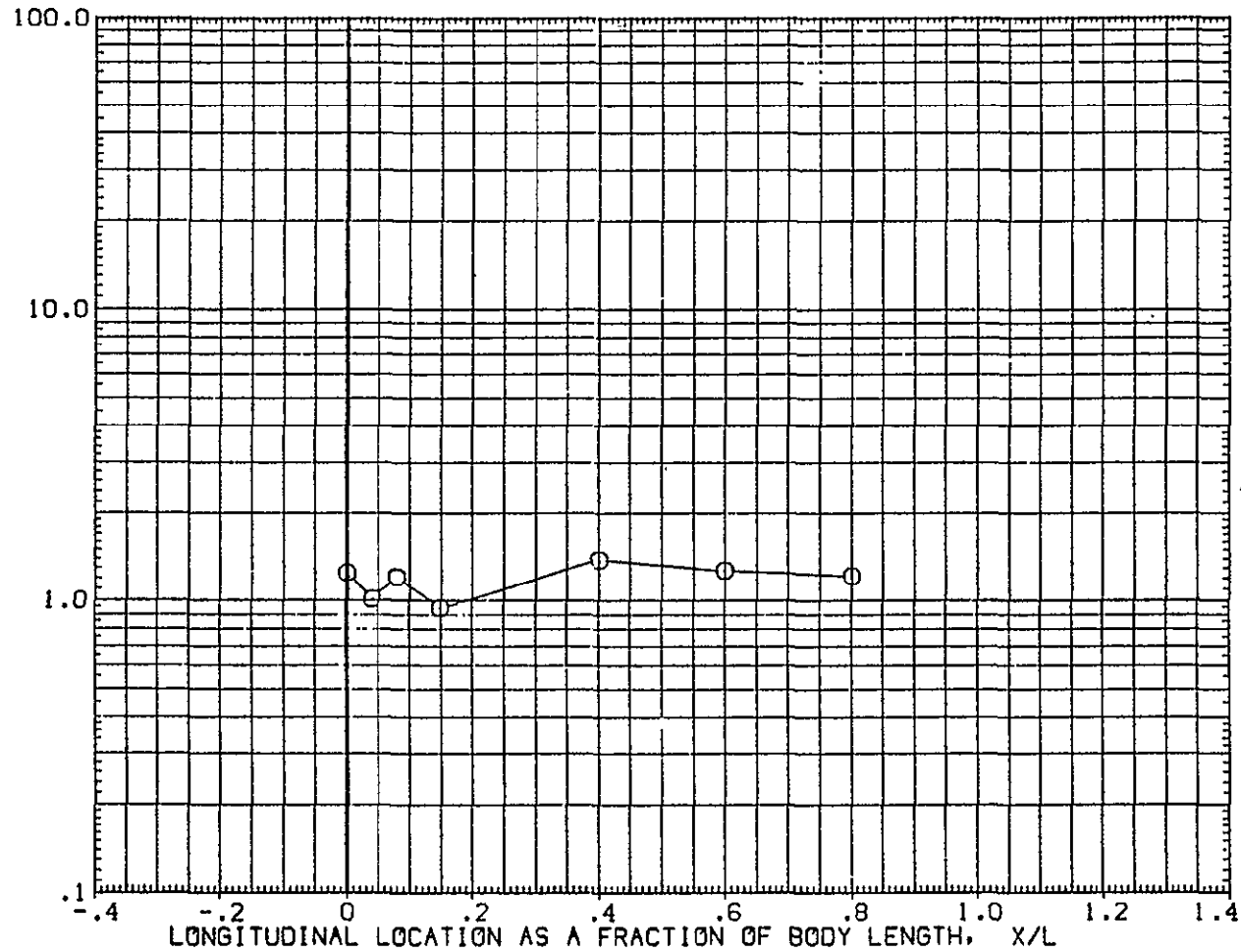


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

0H12 + IH21 MODEL 37 0T(06)/T(02) TANK (IUGT06)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
O	.900	180.000	18.980	ALPHA	5.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT. HI/HU

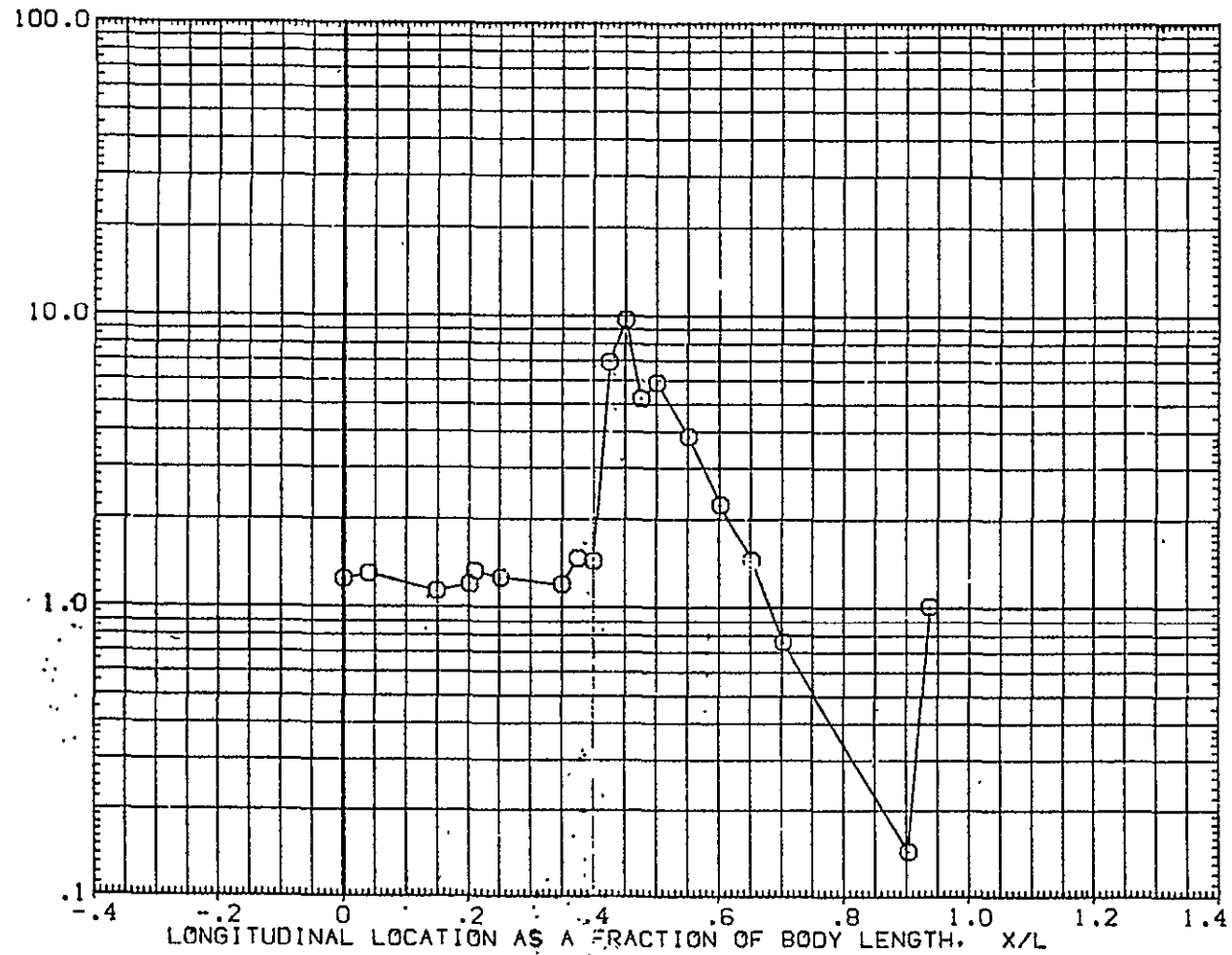


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

OH12 + 1H21 MODEL 37 OT(06)/T(02) TANK (IUGT06)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
O	.900	199.000	18.980	5.000	BETA	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

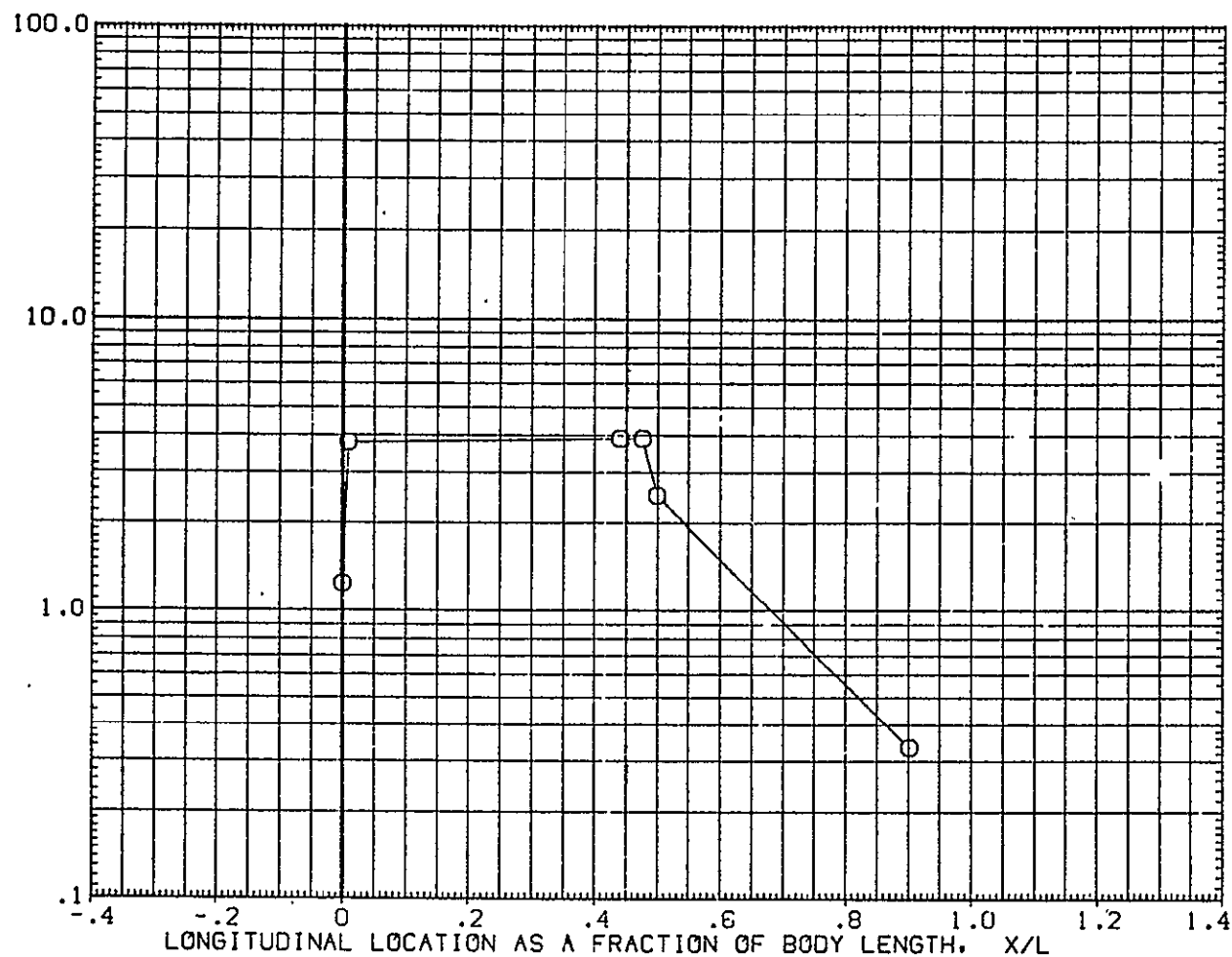


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

OH12 + IH21 MODEL 37 CT(06)/T(02) TANK

(IUGT06)

SYMBOL
○HAW/HT
.900PHI
221.000MACH
18.980

ALPHA

PARAMETRIC VALUES
5.000 BETA

.000

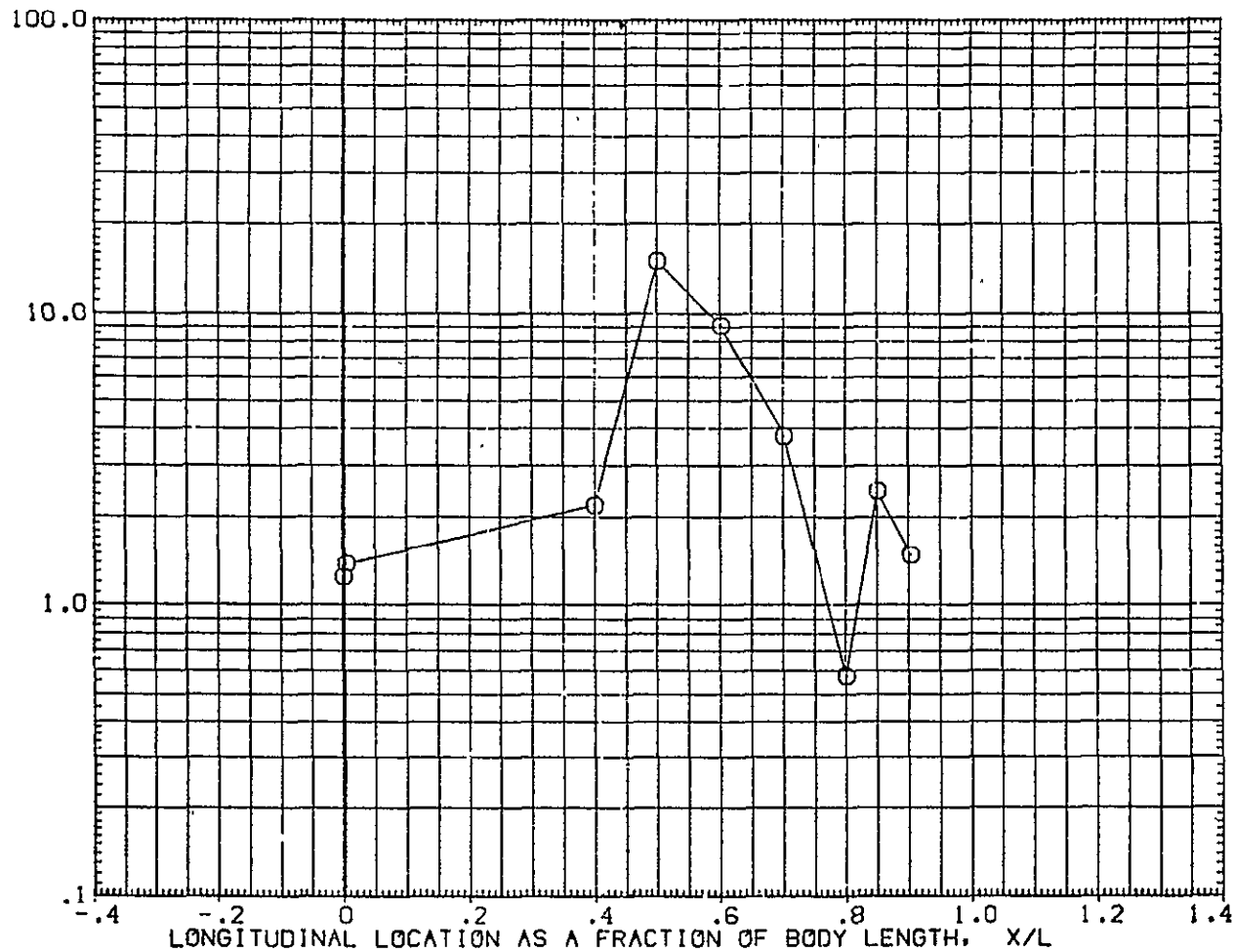
RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU 

FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

0H12 + 1H21 MODEL 37 0T(06)/T(02) TANK (1UGT06)

SYMBOL
O
HAW/HT
.900
PHI
241.000
MACH
18.980

PARAMETRIC VALUES
ALPHA
5.000
BETA
.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

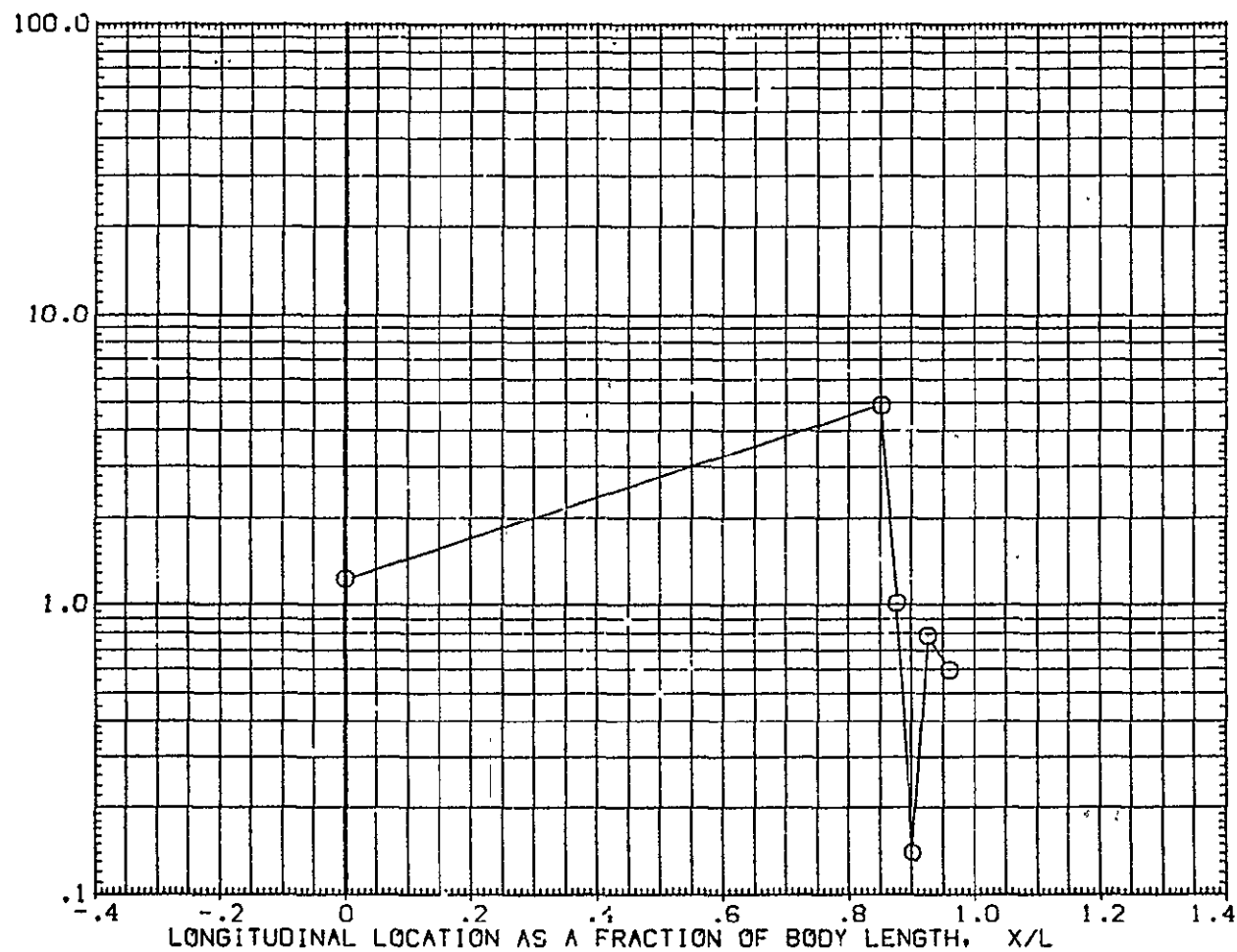


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

0H12 + IH21 MODEL 37 0T(06)/T(02) TANK (IUGT06)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	.000
O	.900	247.000	18.950		5.000		

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

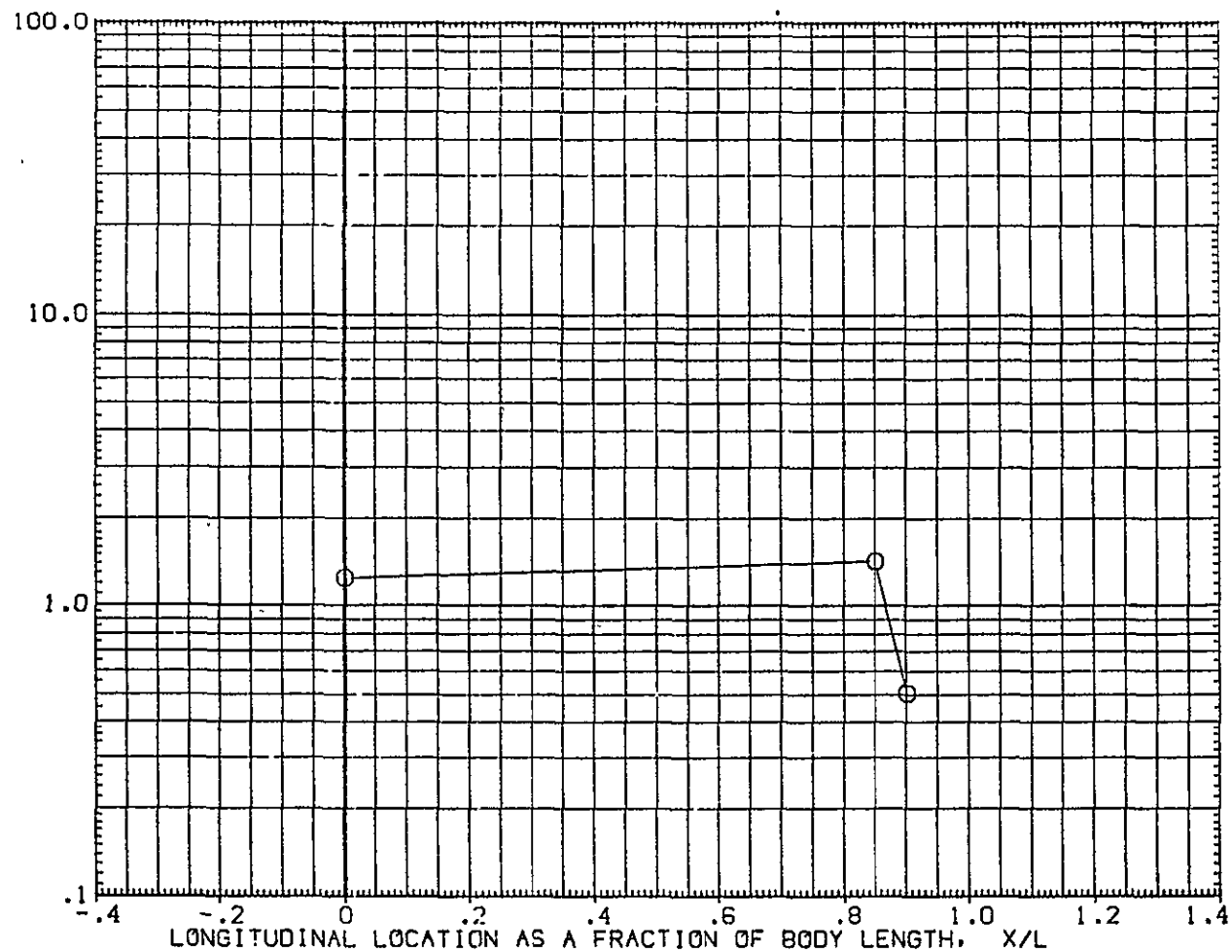


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

0412 + 1H21 MODEL 37 OT(06)/T(02) TANK (1UGT06)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
O	.900	270.000	18.980	ALPHA	5.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

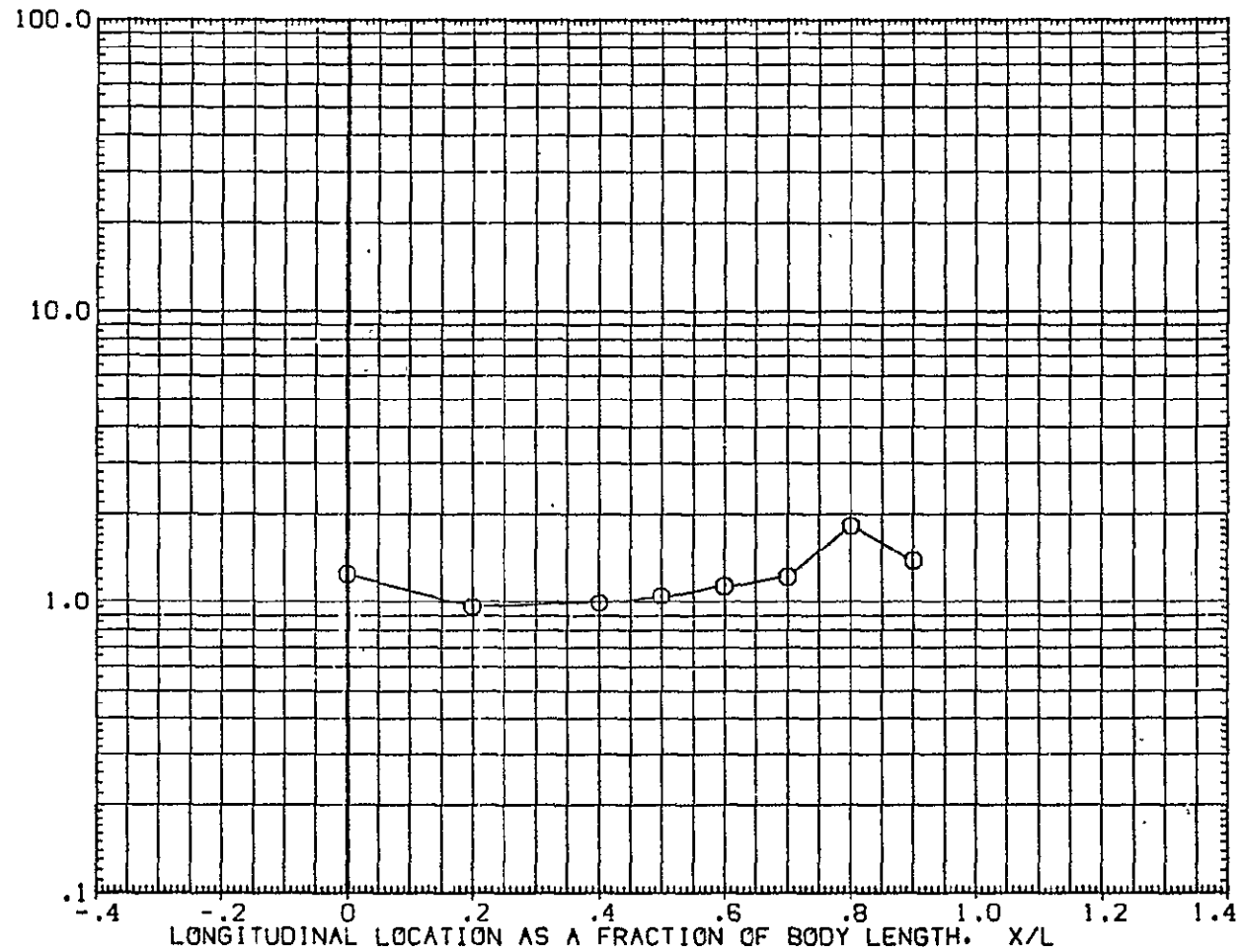


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

OH12 + IH21 MODEL 37 OT(06)/T(02) TANK (IUGT06)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.900	315.000	18.980	ALPHA	5.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

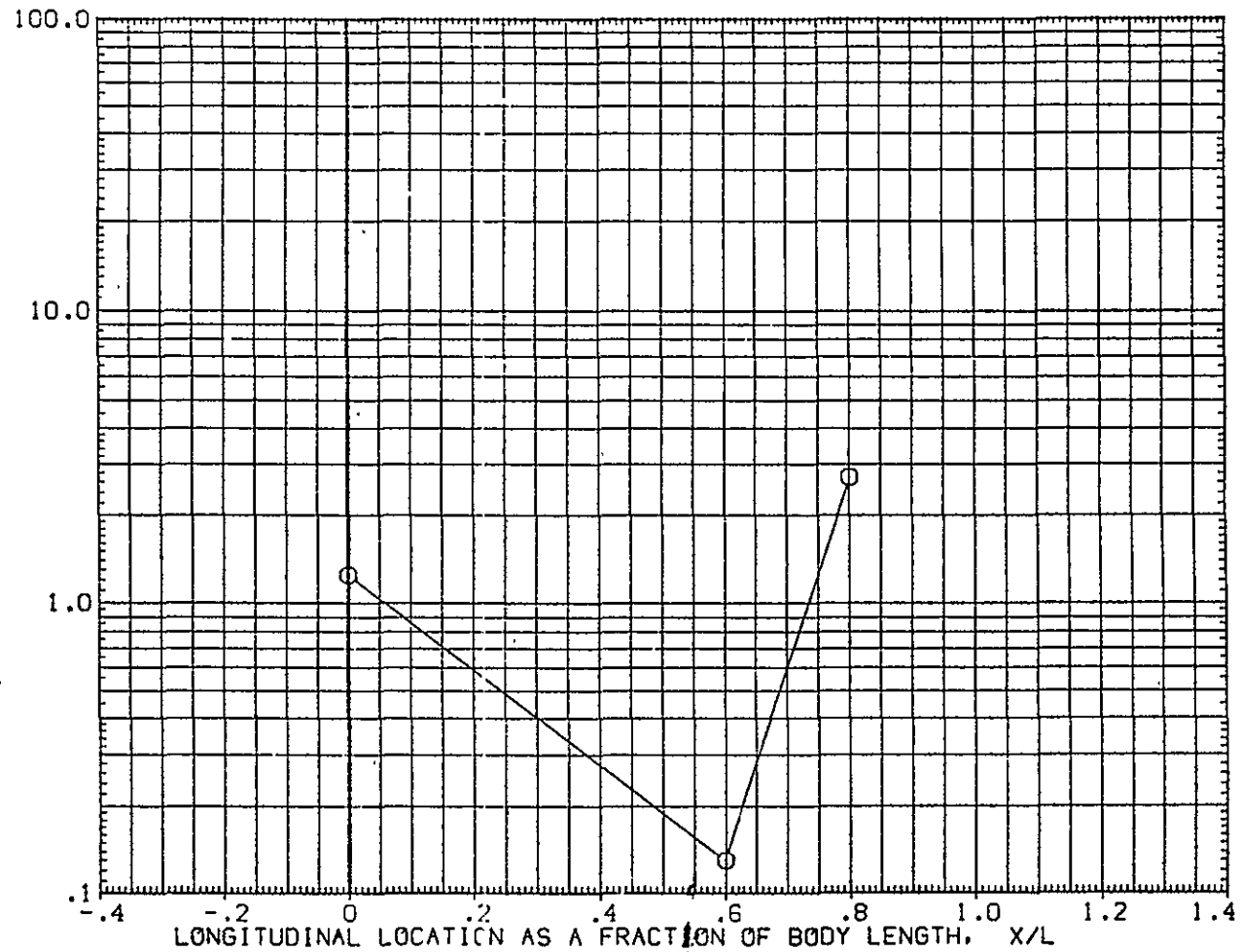


FIG. 5 EFFECT OF RECOVERY FACTOR ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 5

OH12/IH21 (C/L HST 173-100) 37 T-NP TANK (RUGT03)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
◇	.850	.000	18.430	ALPHA	.000	BETA
□	.900					.000
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

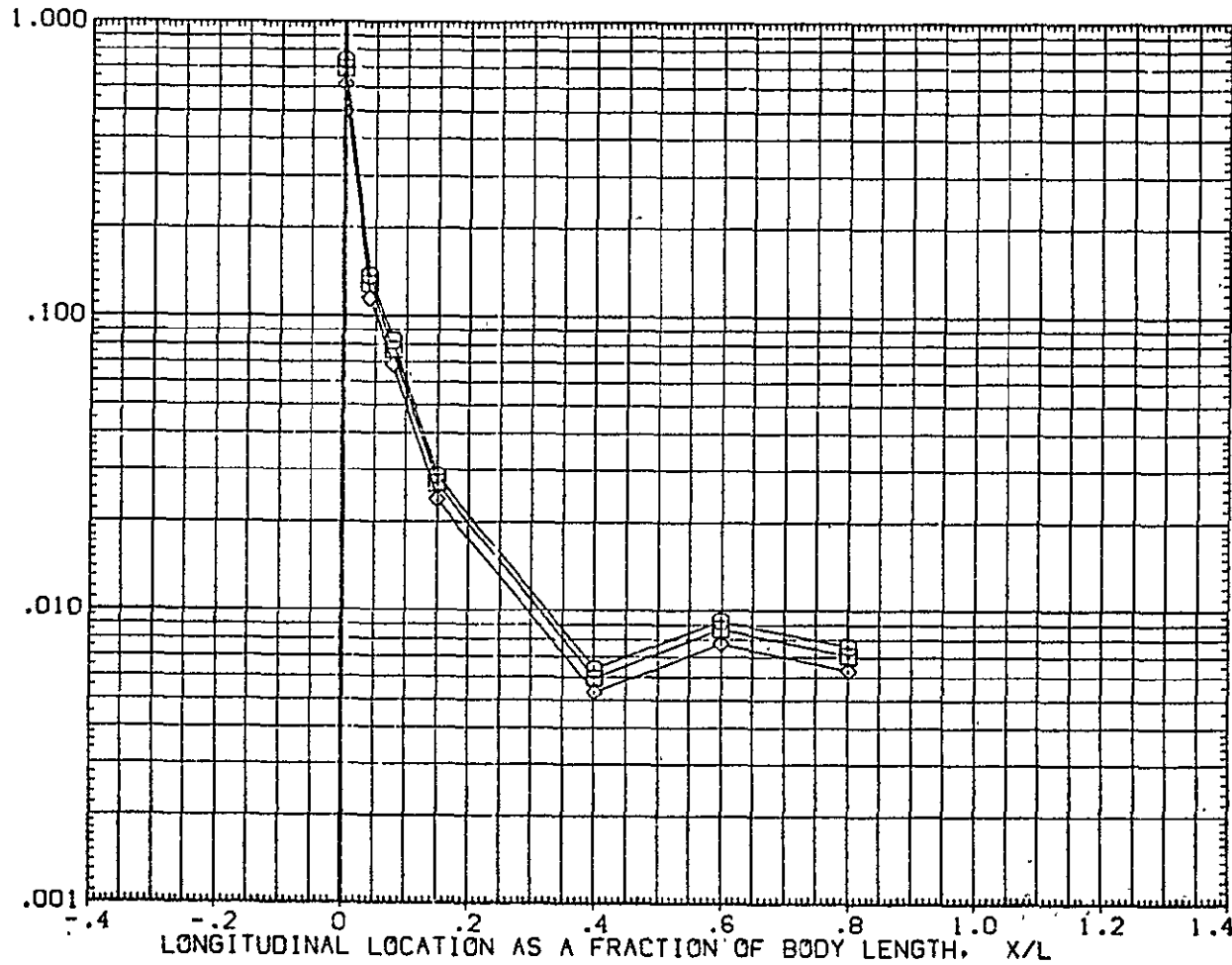


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

ØH12/IH21 (CAL HST 173-100) 37 T-NP TANK (RUGT03)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
	.850	180.000	18.430	ALPHA	.000	BETA .000
	.900					
	1.000					

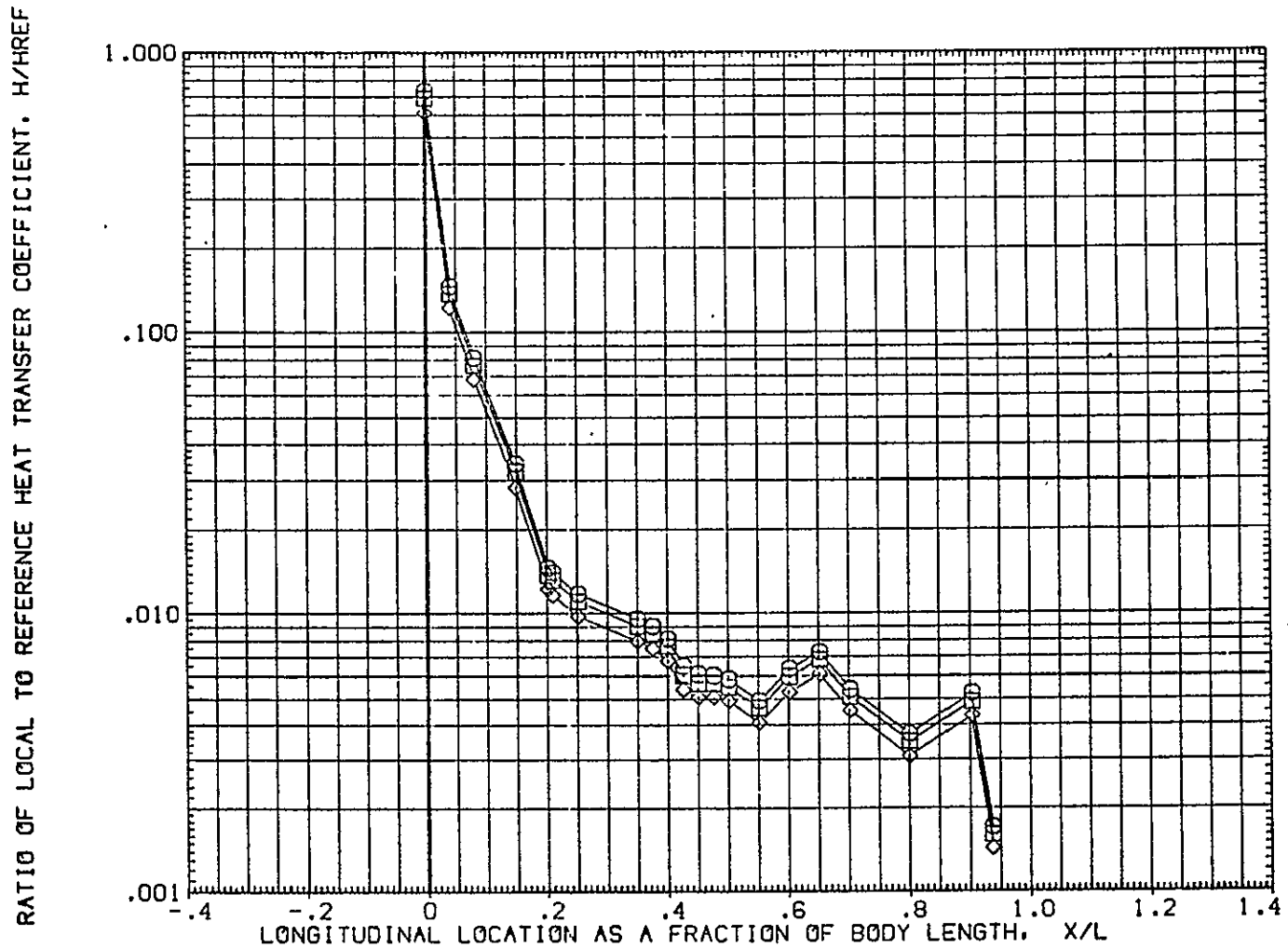


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

GH12/IH21 (CAL HST 173-100) 37 T-NP TANK (RUGT03)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
◇	.850	199.000	18.430		.000	BETA .000
□	.900					
○	1.000					

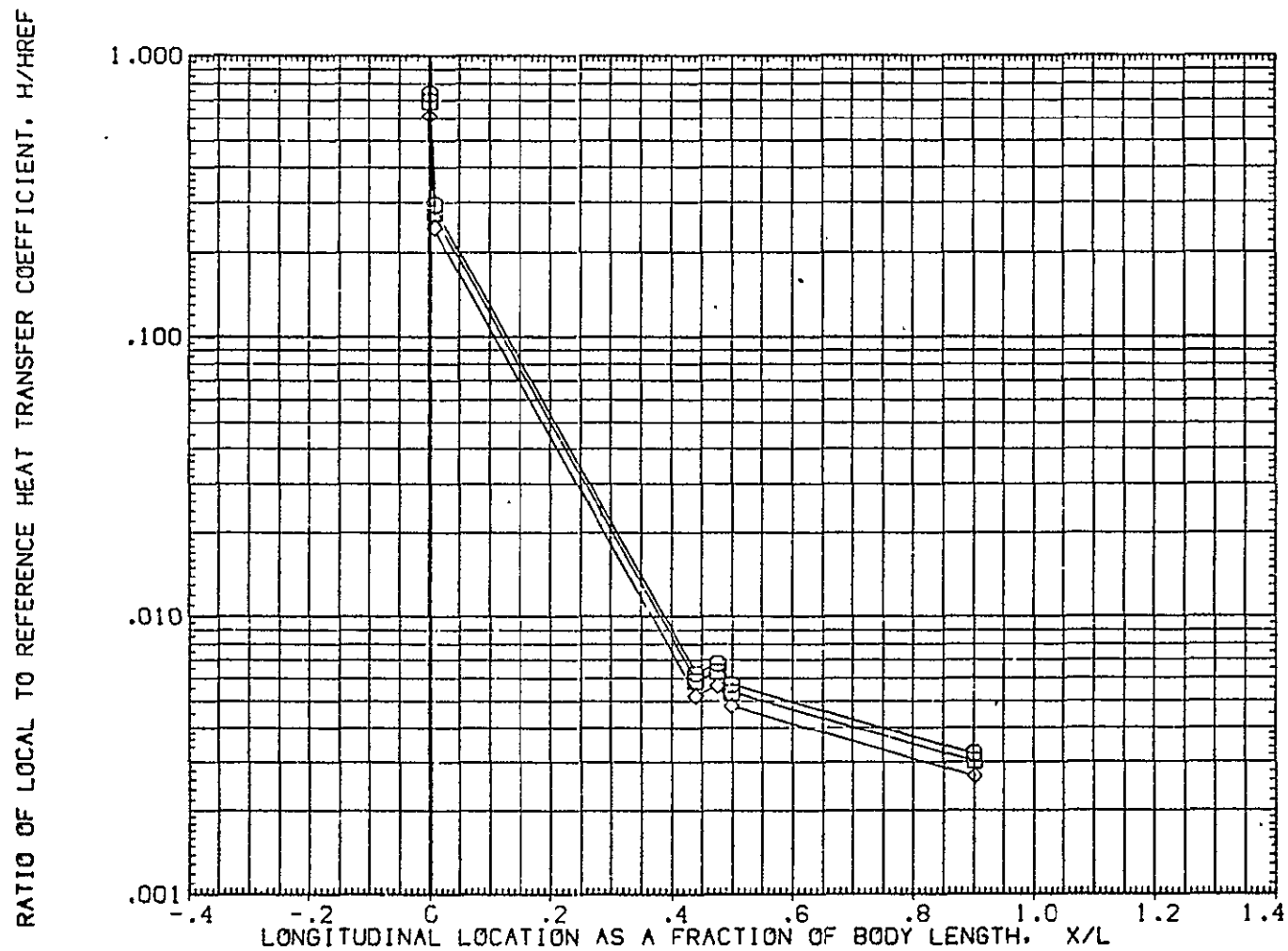


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

0H12/1H21 (CAL HST 173-100) 37 T-NP TANK (RUGT03)

SYMBOL	NAV/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	221.000	18.430	ALPHA	.000	BETA
□	.900					.000
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

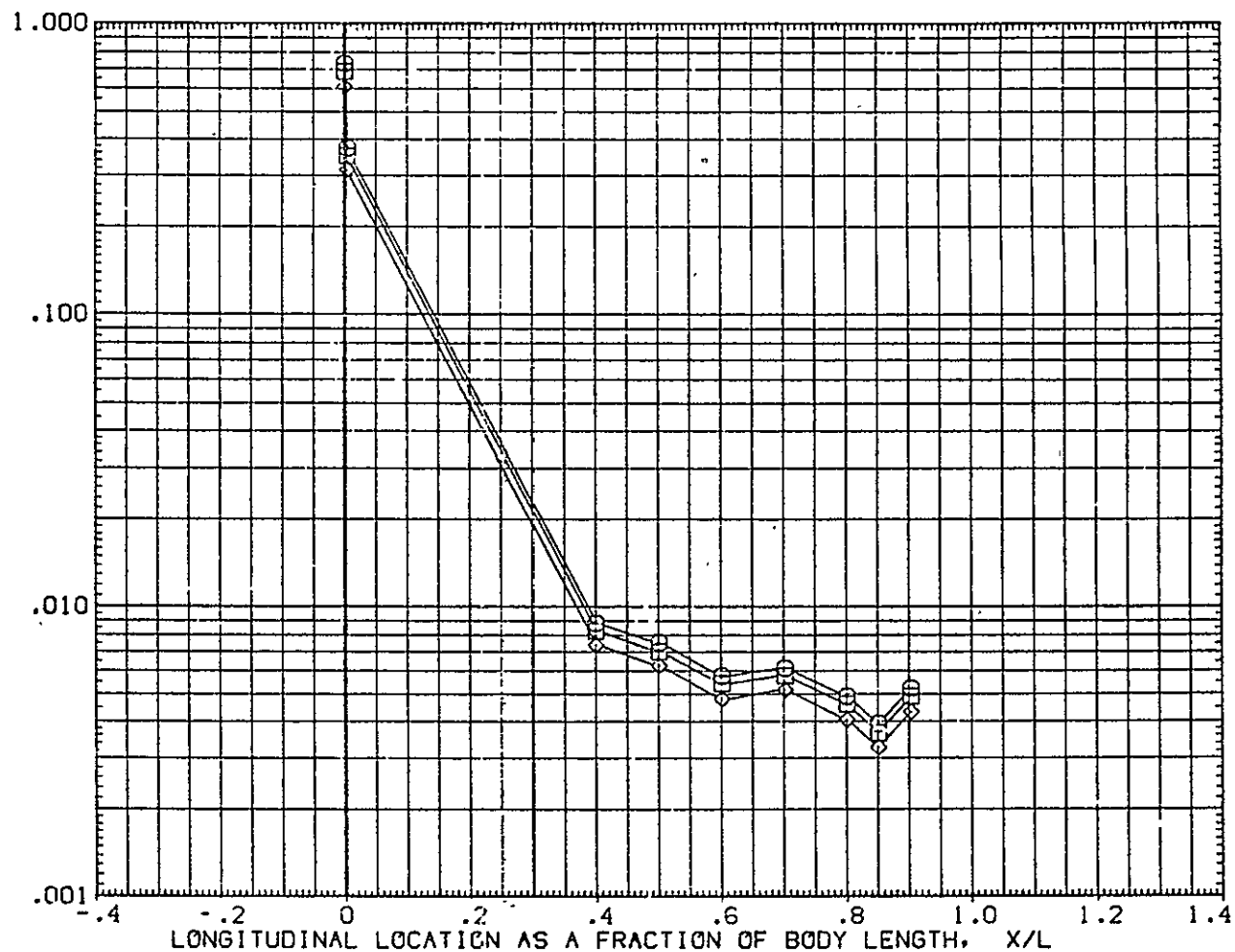


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

0H12/1H21 (CAL HST 173-100) 37 T-NP TANK (RUGT03)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	241.000	18.430			
□	.900					
◇	1.000					

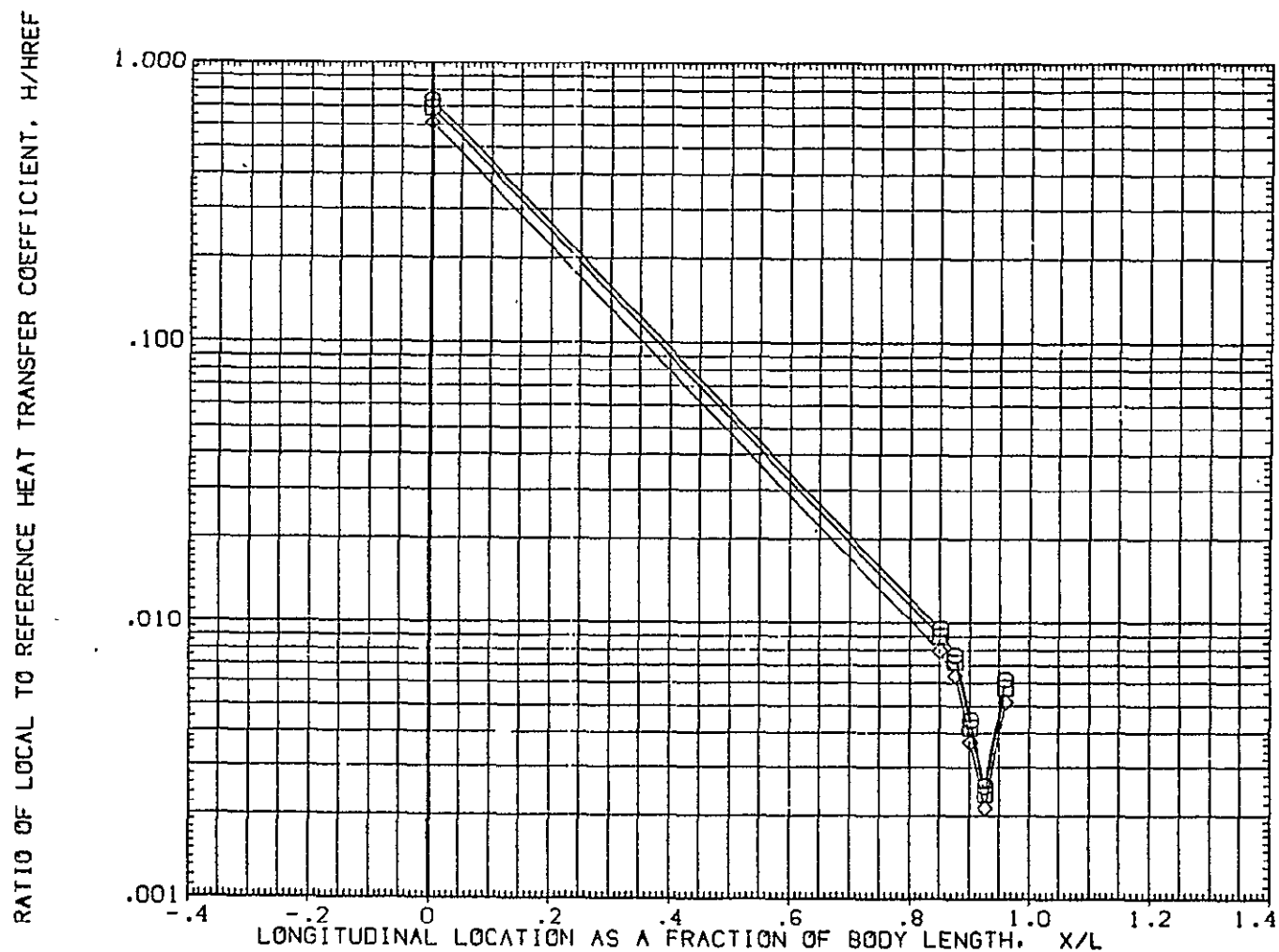


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

OH12/1H21 (CAL HST 173-100) 37 T-NP TANK (RUGT03)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
□	.850	247.000	18.430	ALPHA	.000	BETA
◇	.900					
	1.000					.000

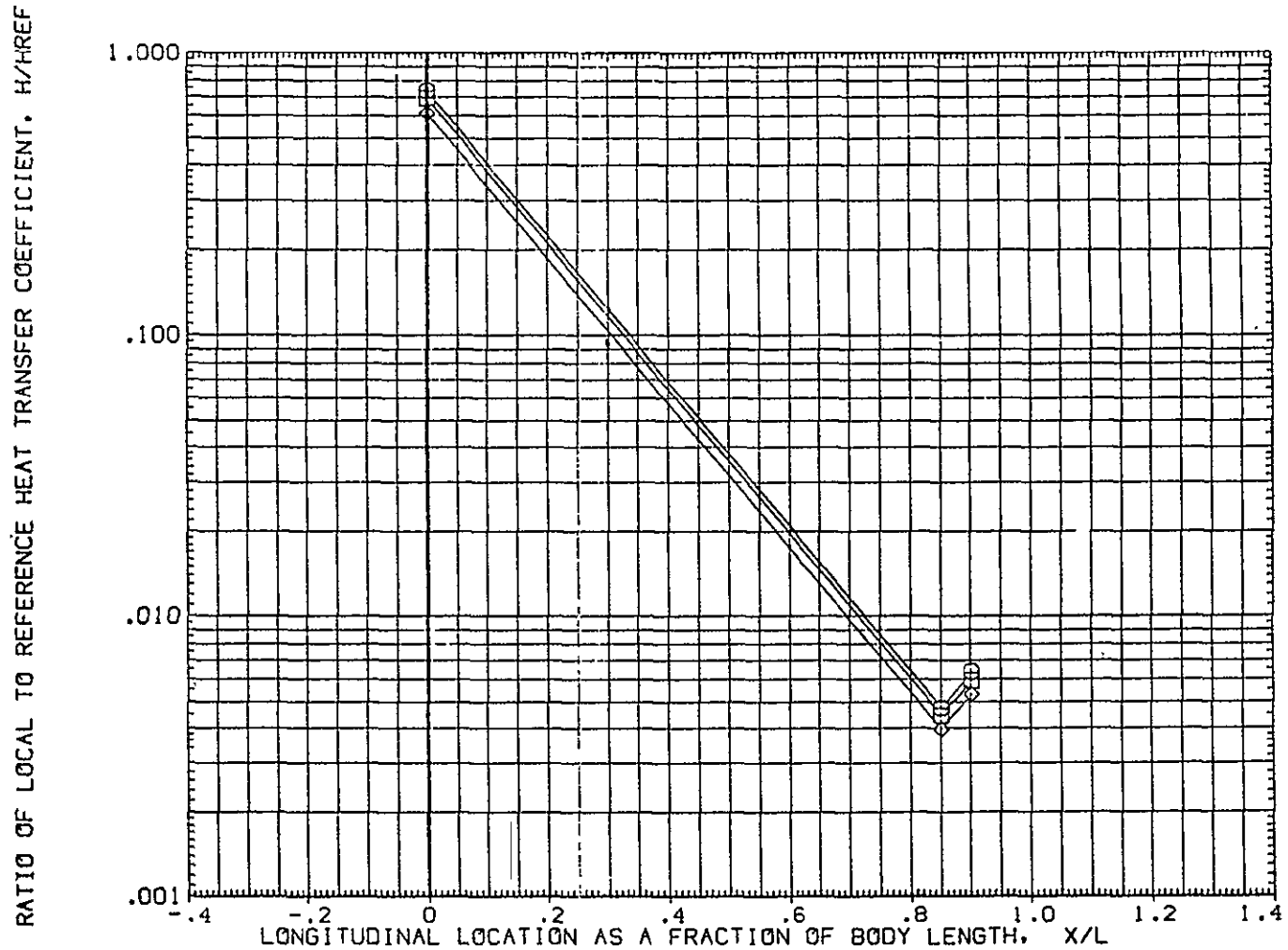


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

0H12/1H21 (CAL HST 173-100) 37 T-NP TANK (RUGT03)

SYMBOL	HAV/HT	PHI	MACH	PARAMETRIC VALUES
○	.850	270.000	18.430	ALPHA .000 BETA .000
□	.900			
◇	1.000			

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

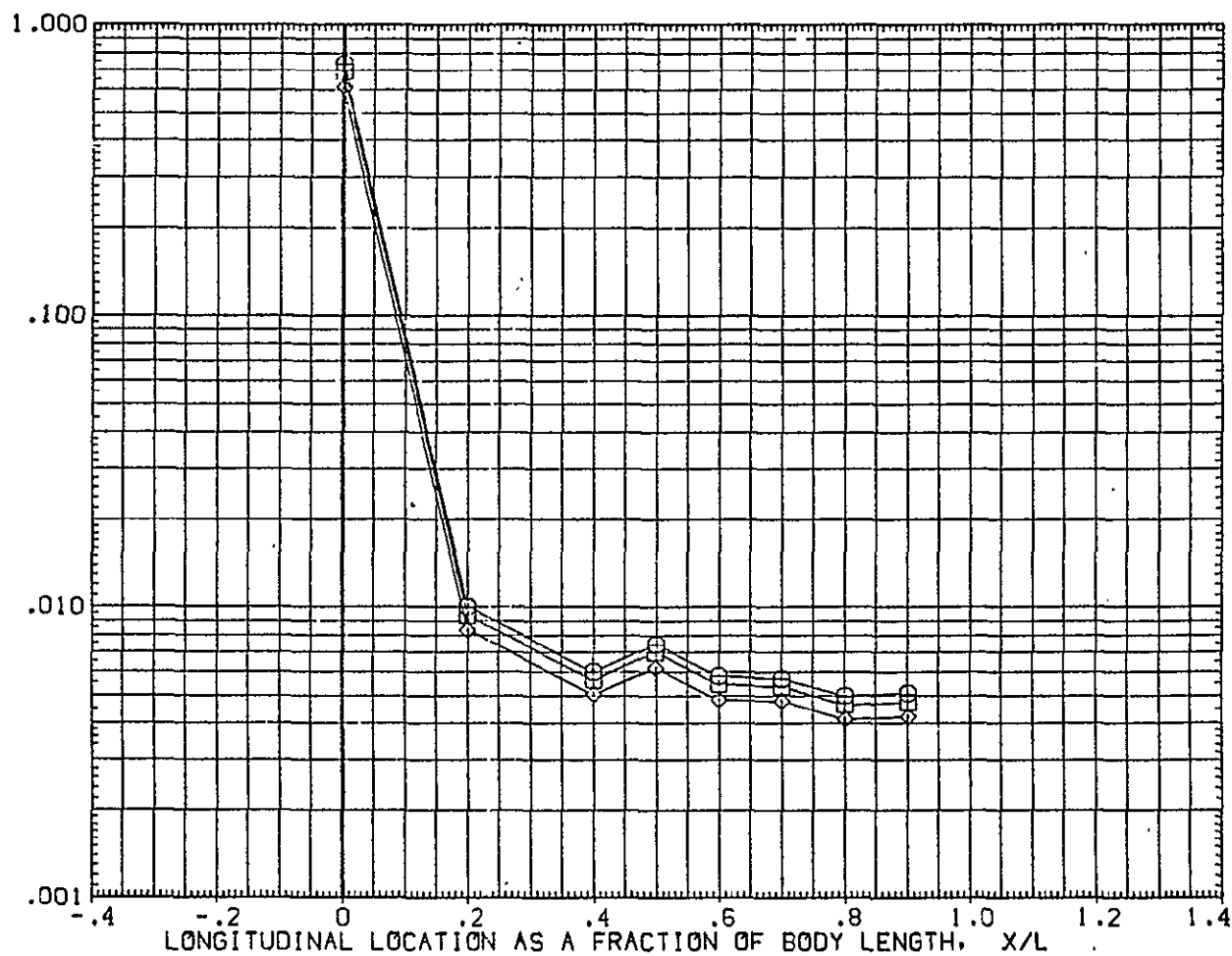


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

0H12/IH21 (CAL HST 173-100) 37 T-NP TANK (RUGT03)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	315.000	18.430	.000	.000	.000
□	.900					
○	1.000					

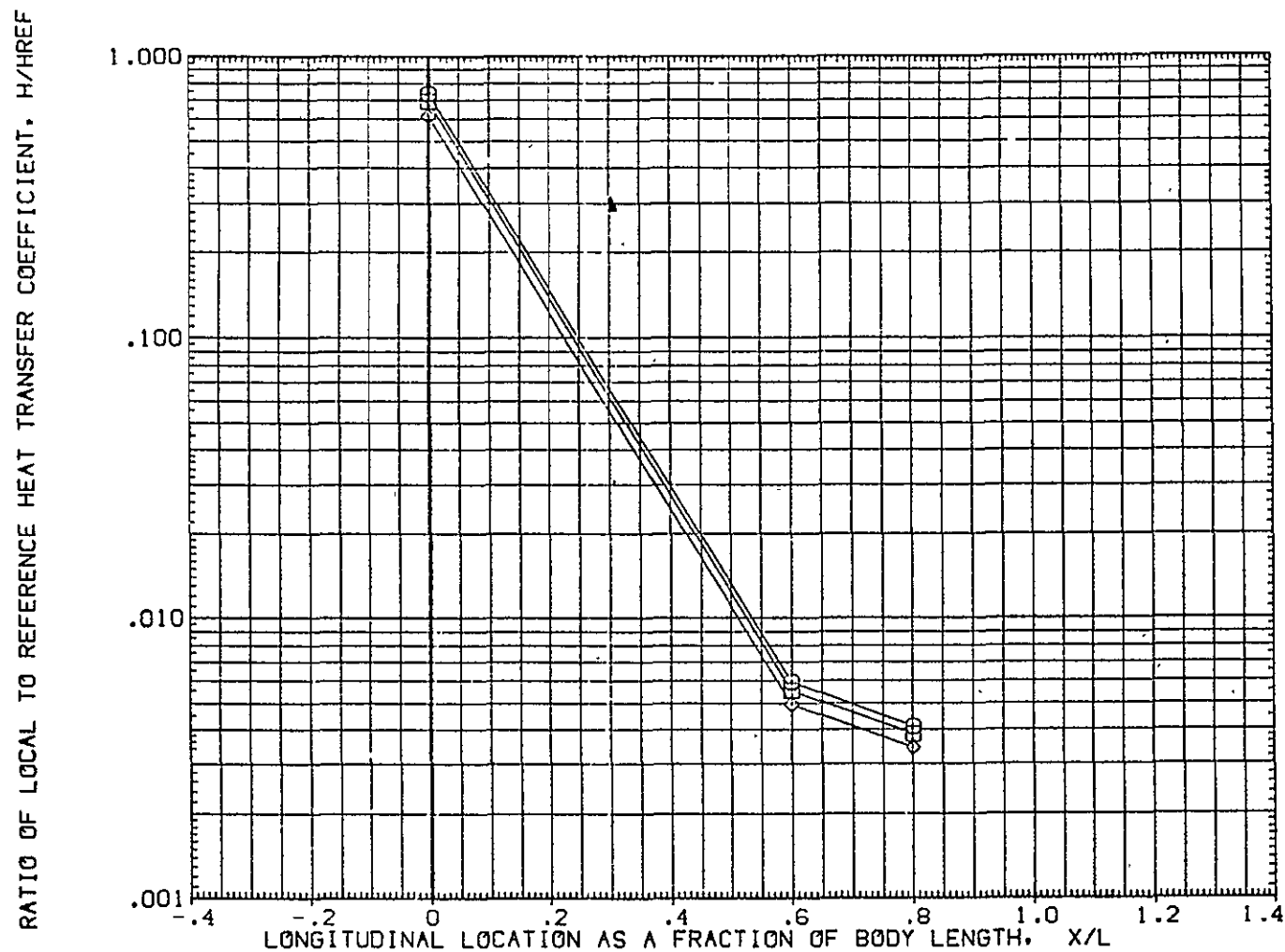


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

OH12/H21 (CAL HST 173-100) 37 0 T-NP TANK

(RUGT04)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	
○	.850	.000	17.920				
□	.900						
◇	1.000						

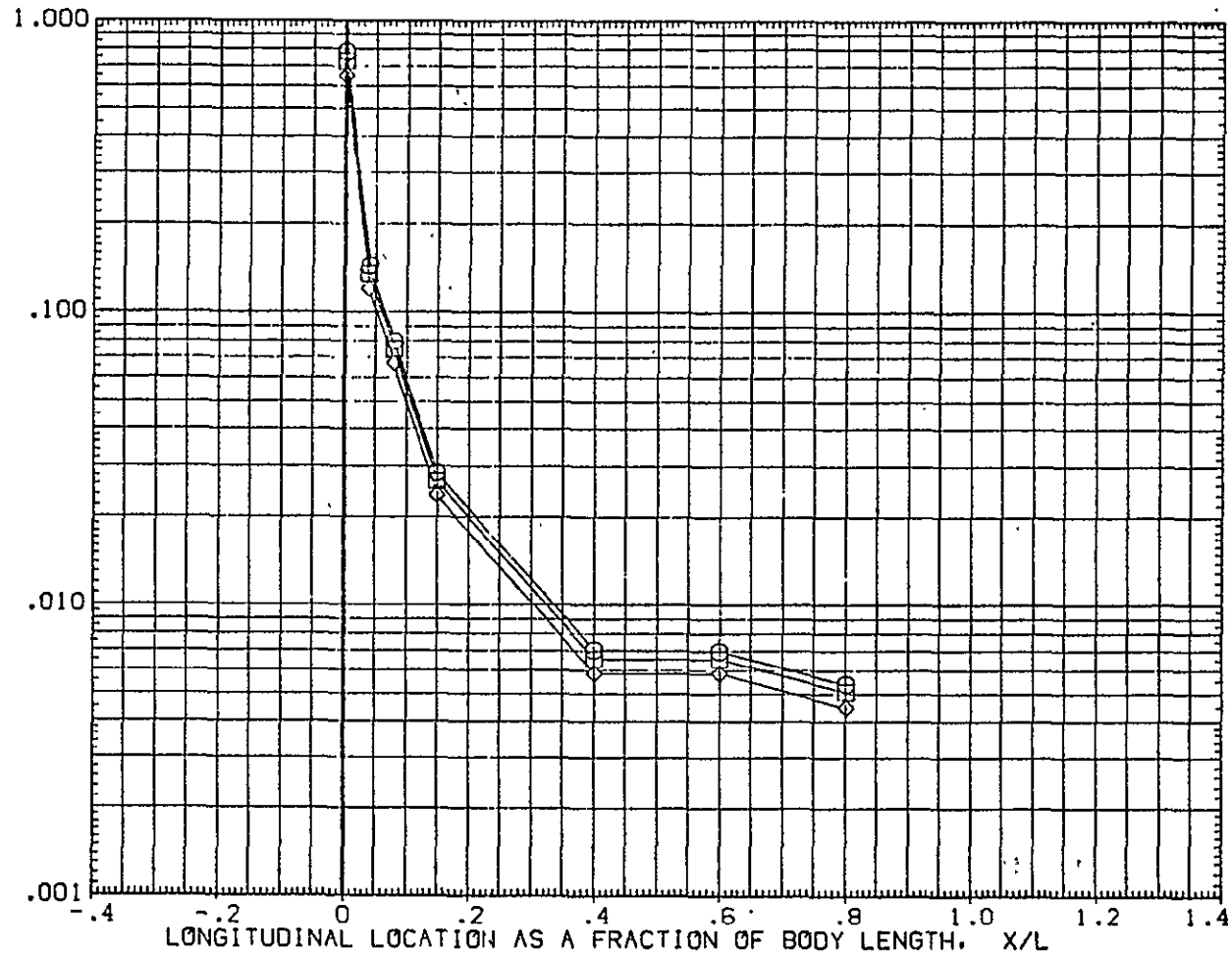
RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF} 

FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

0H12/IH21 (CAL HST 173-100) 37 0 T-NP TANK (RUGT04)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
	.850	180.000	17.920	ALPHA	.000	BETA
	.900					.000
	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

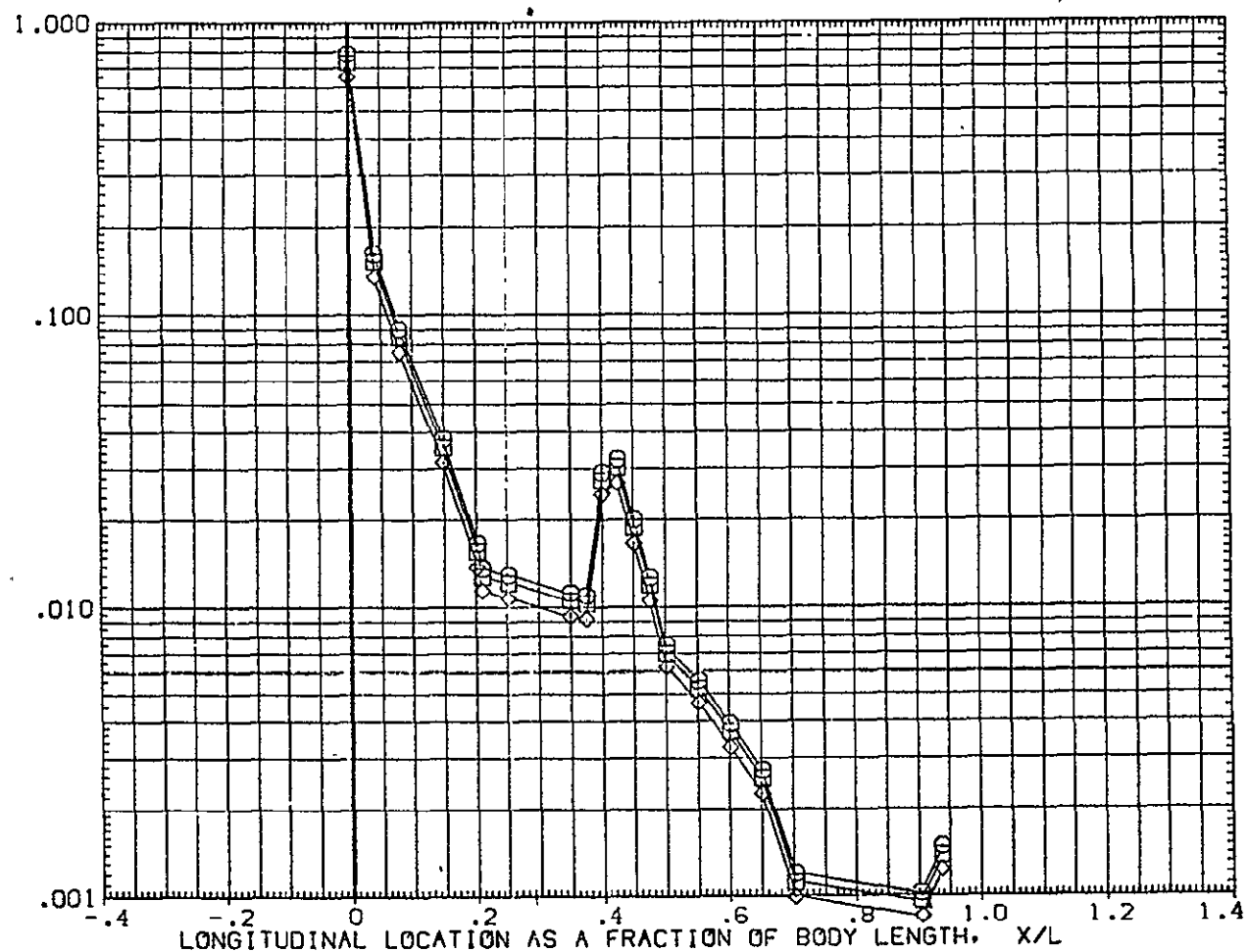


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

C-3

0H12/1H21 (CAL HST 173-100) 37 0 T-NP TANK (RUGT04)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES		
◇	.850	199.000	17.920		.000	BETA	.000
□	.900						
◇	1.000						

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

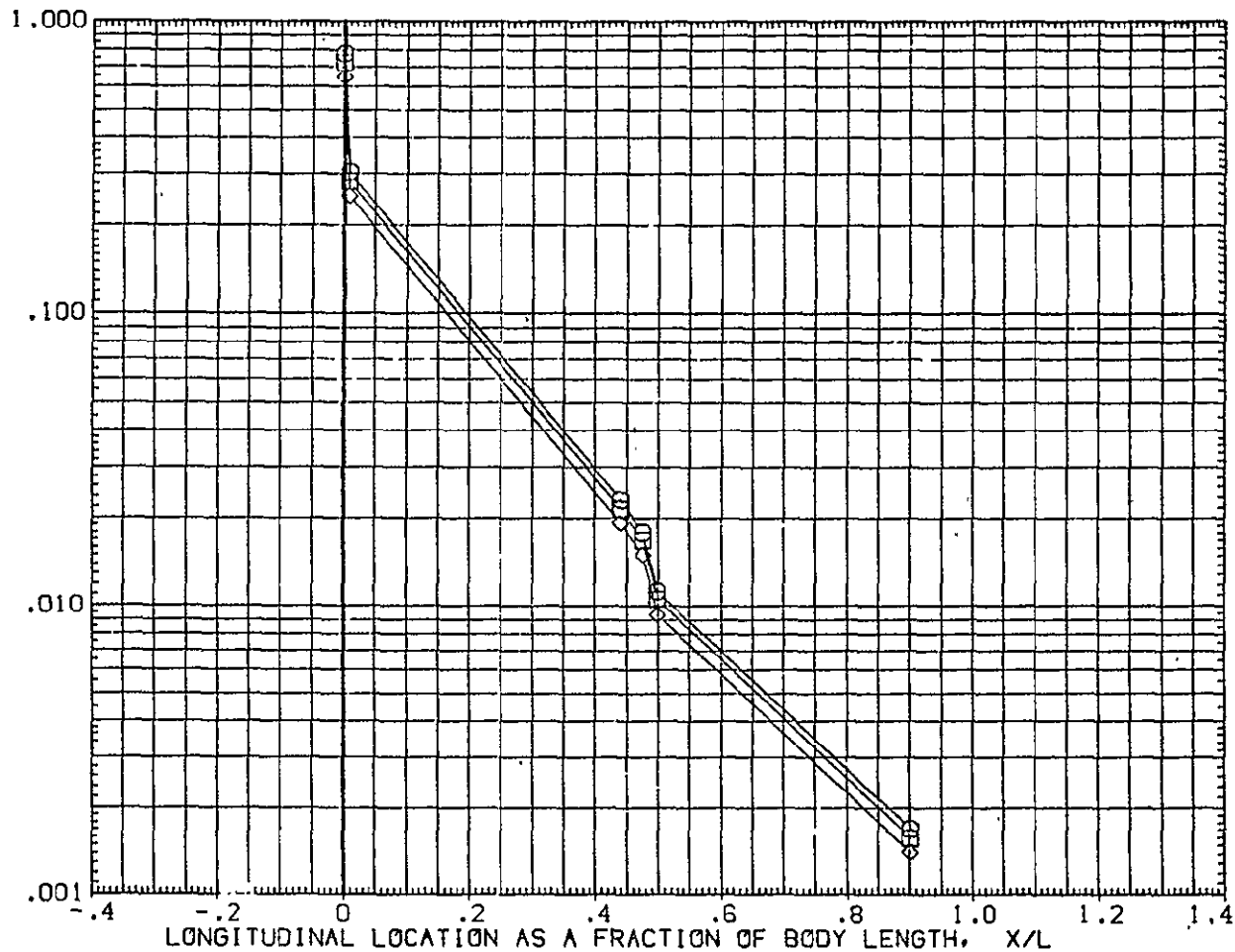


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

OH12/IH21 (CAL HST 173-100) 37 0 T-NP TANK

(RUGT04)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	221.000	17.920	ALPHA	.000	BETA
□	.900					
◇	1.000					.000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

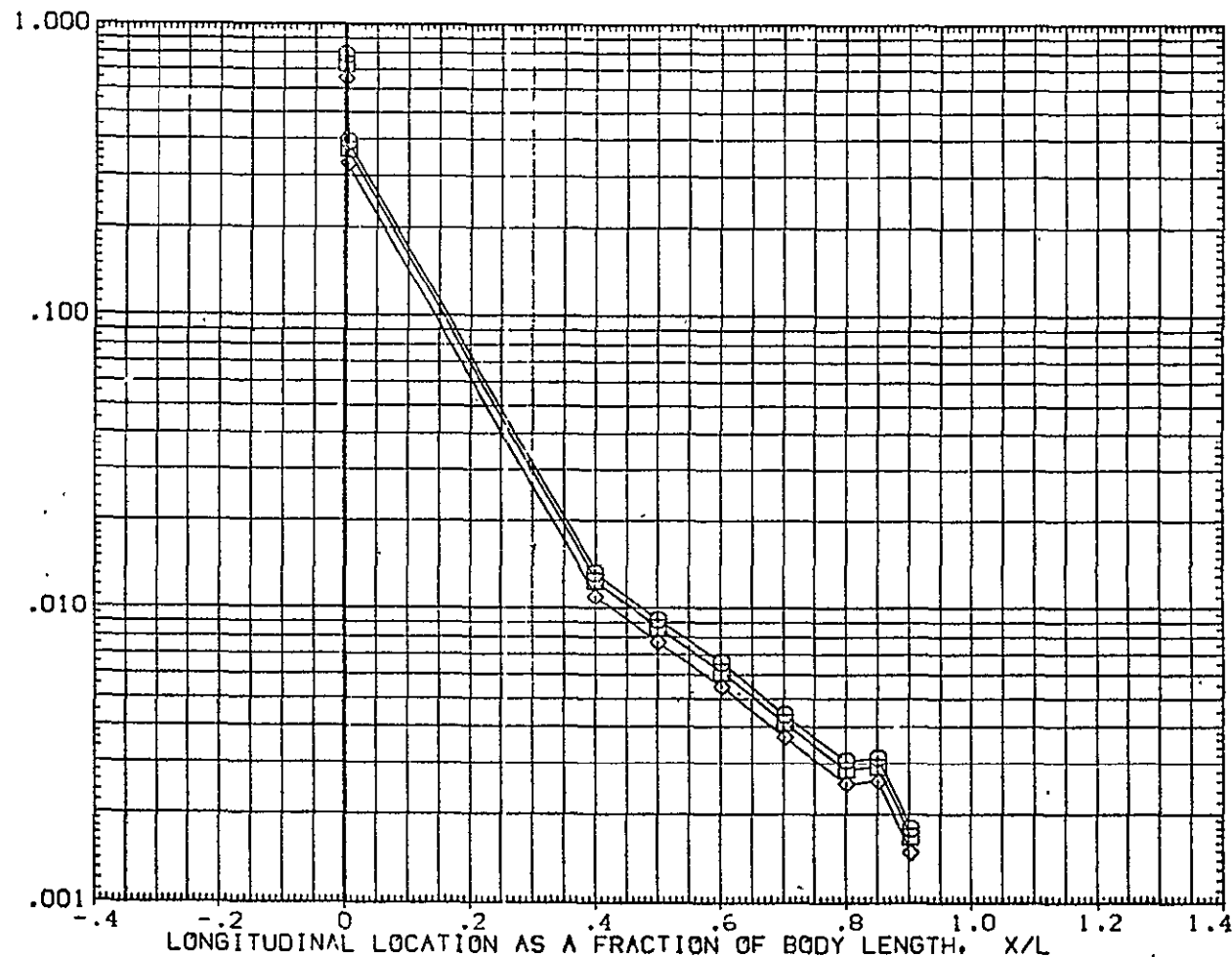


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

0H12/1H21 (CAL HST 173-100) 37 0 T-NP TANK

(RUGT04)

SYMBOL
○
□
◇

HAW/HT .850
.900
1.000
PHI 241.000
MACH 17.920

PARAMETRIC VALUES
ALPHA .000
BLTA .000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

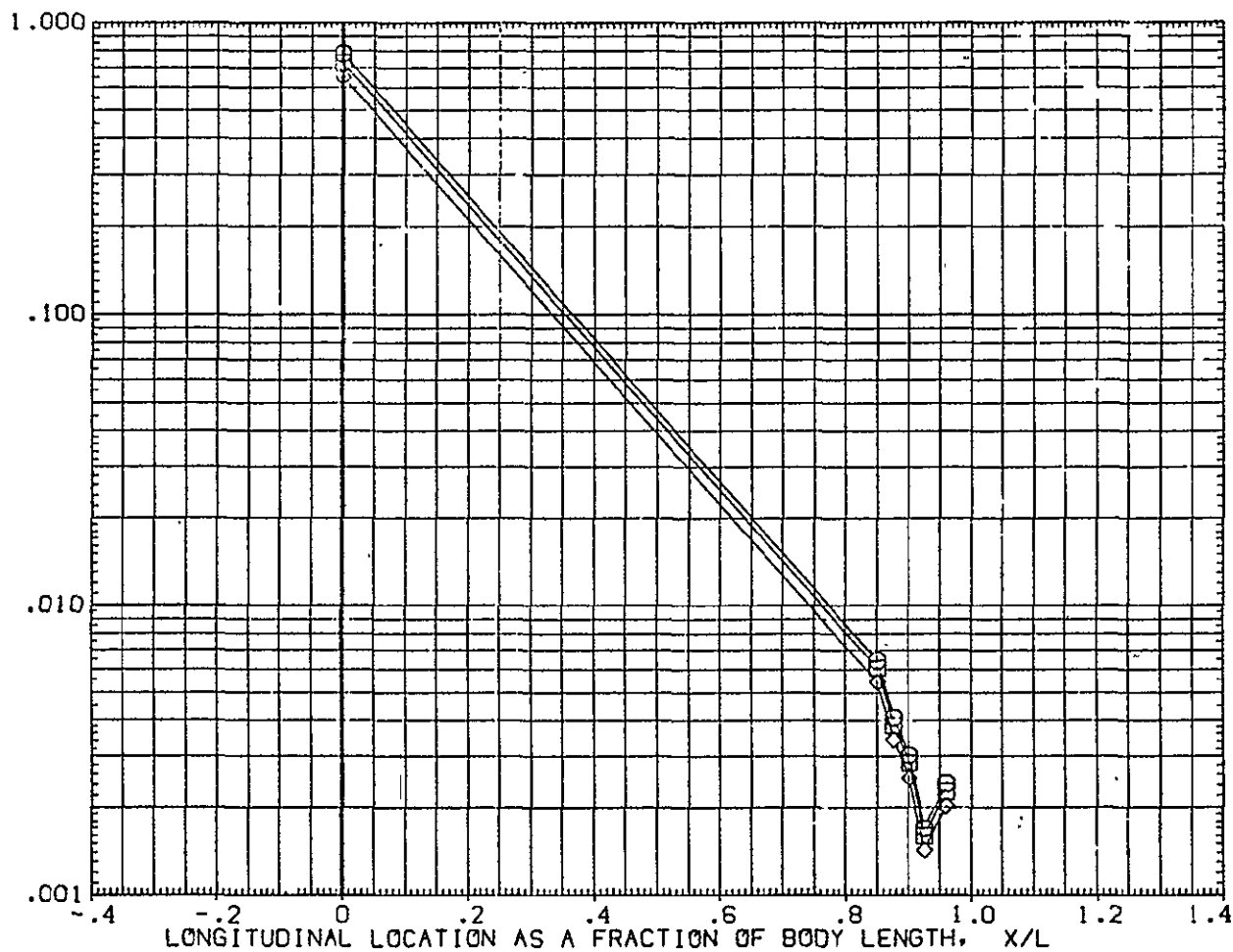


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

0H12/IH21 (CAL HST 173-100) 37 ° T-NP TANK (RUGT04)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
◇	.850	247.000	17.920	.000	BETA	.000
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

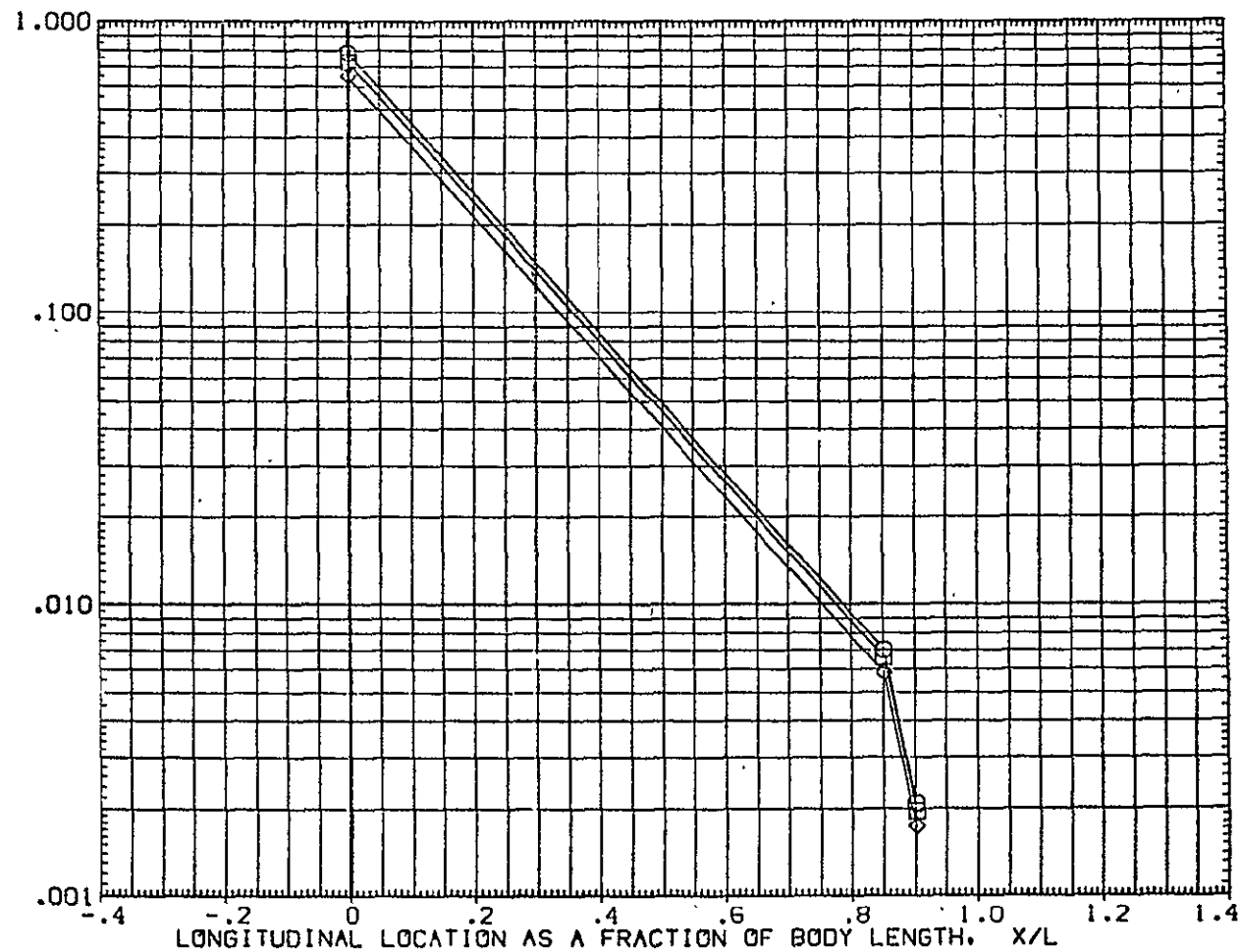


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

OH12/IH21 (CAL HST 173-100) 37 0 T-NP TANK (RUGT04)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.850	270.000	17.920		.000	BETA
□	.900					.000
◇	1.000					

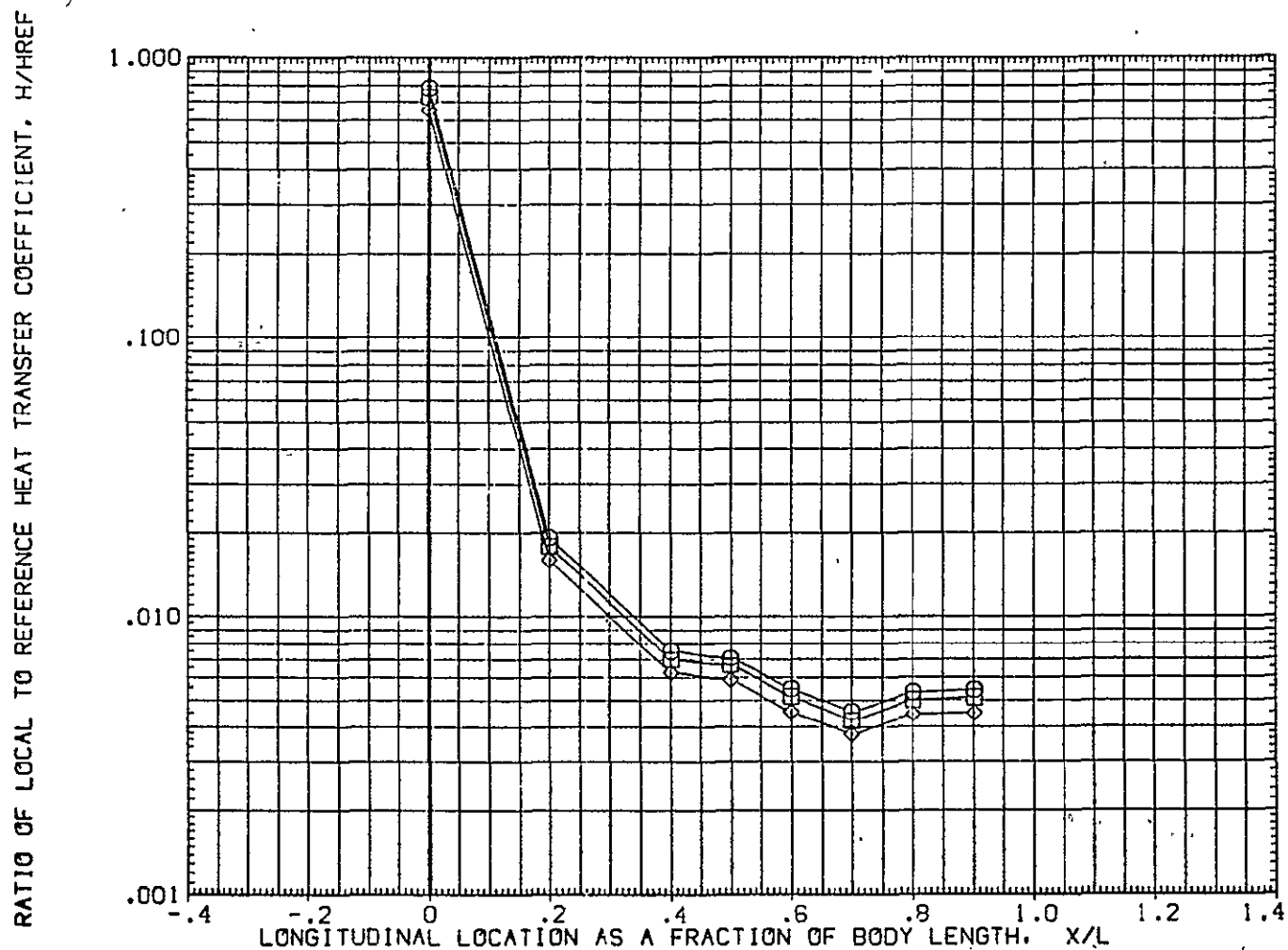


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

0H12/IH21 (CAL HST 173-100) 37 0 T-NP TANK (RUGT04)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
□	.850	315.000	17.920		.000	BETA
◇	.900					.000
◇	1.000					

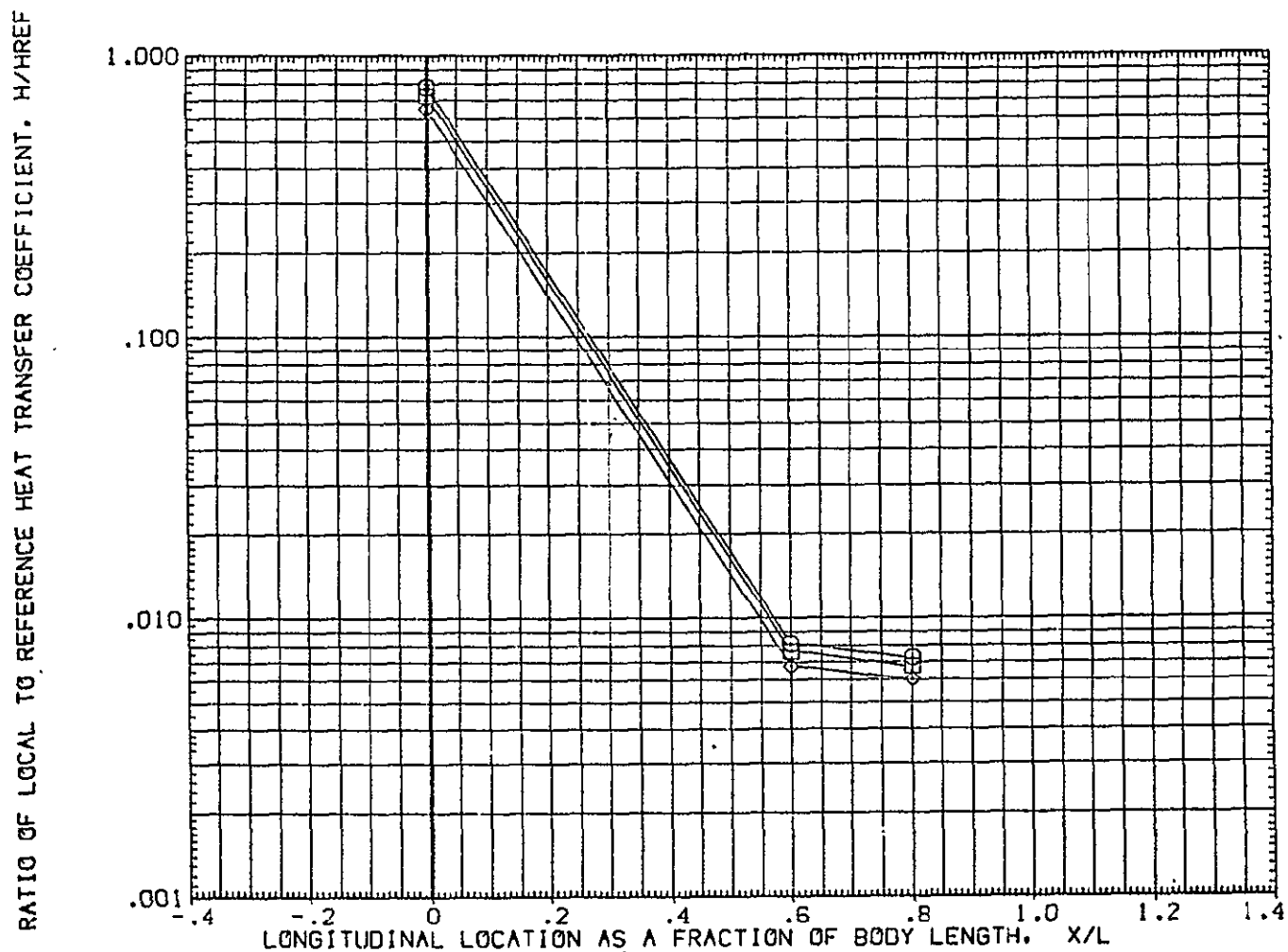


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

OH12 + IH21 MODEL 37 OT-NP(4)/T-NP(3) TANK (IUGT04)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
O	.900	.000	18.200		.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

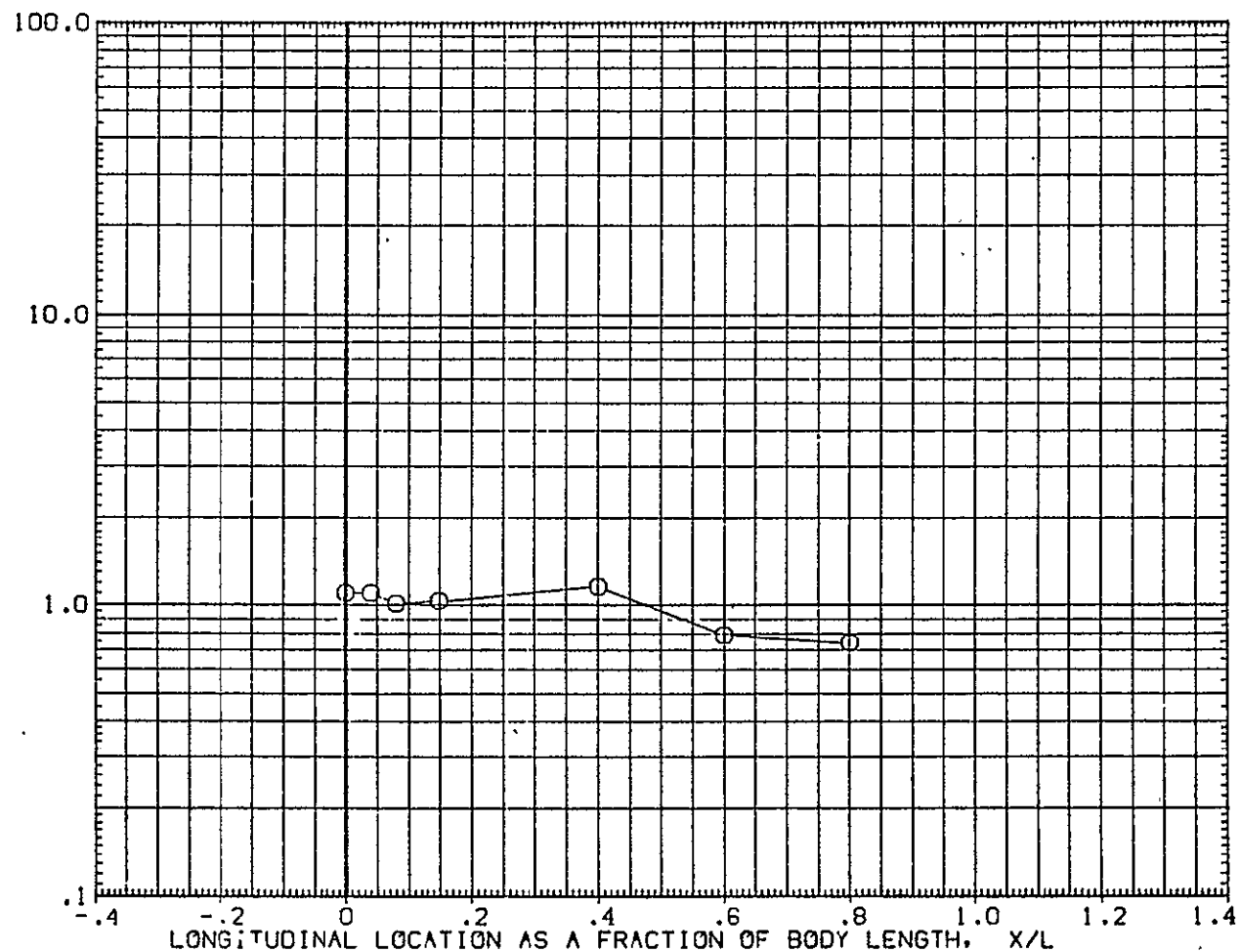


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

0H12 + IH21 MODEL 37 OT-NP(4)/T-NP(3) TANK (IUGT04)

SYMBOL HAW/HT PHI MACH
 O .900 180.000 18.200

PARAMETRIC VALUES
 ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO DISTURBED HEAT TRANSFER COEFFICIENT, h_i/h_u

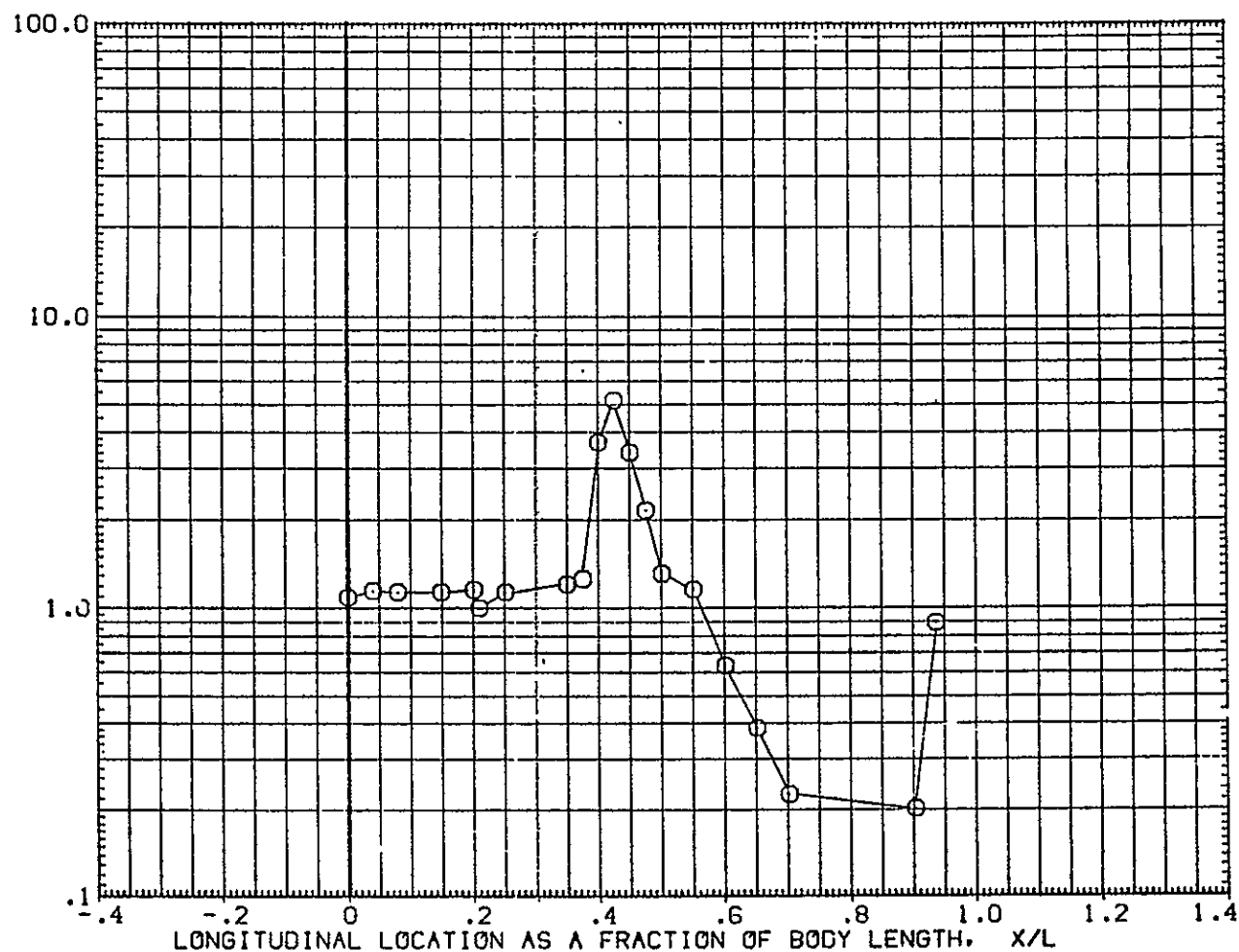


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

OH12 + IH21 MODEL 37 OT-NP(4)/T-NP(3) TANK (IUGT04)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES
O	.900	199.000	18.200	ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

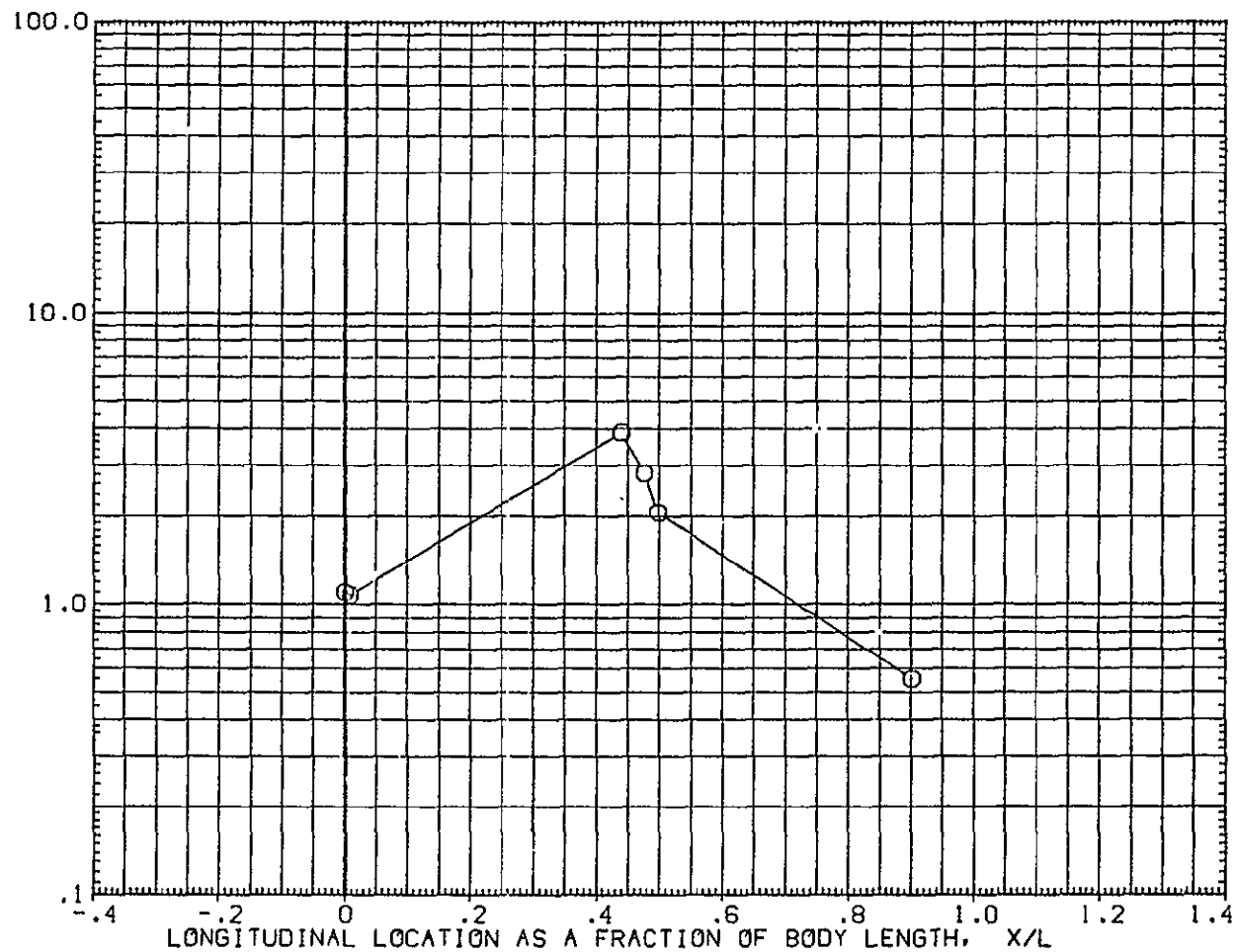


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

OH12 + IH21 MODEL 37 OT-NP(4)/T-NP(3) TANK (IUGT04)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
O	.900	221.000	18.200	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

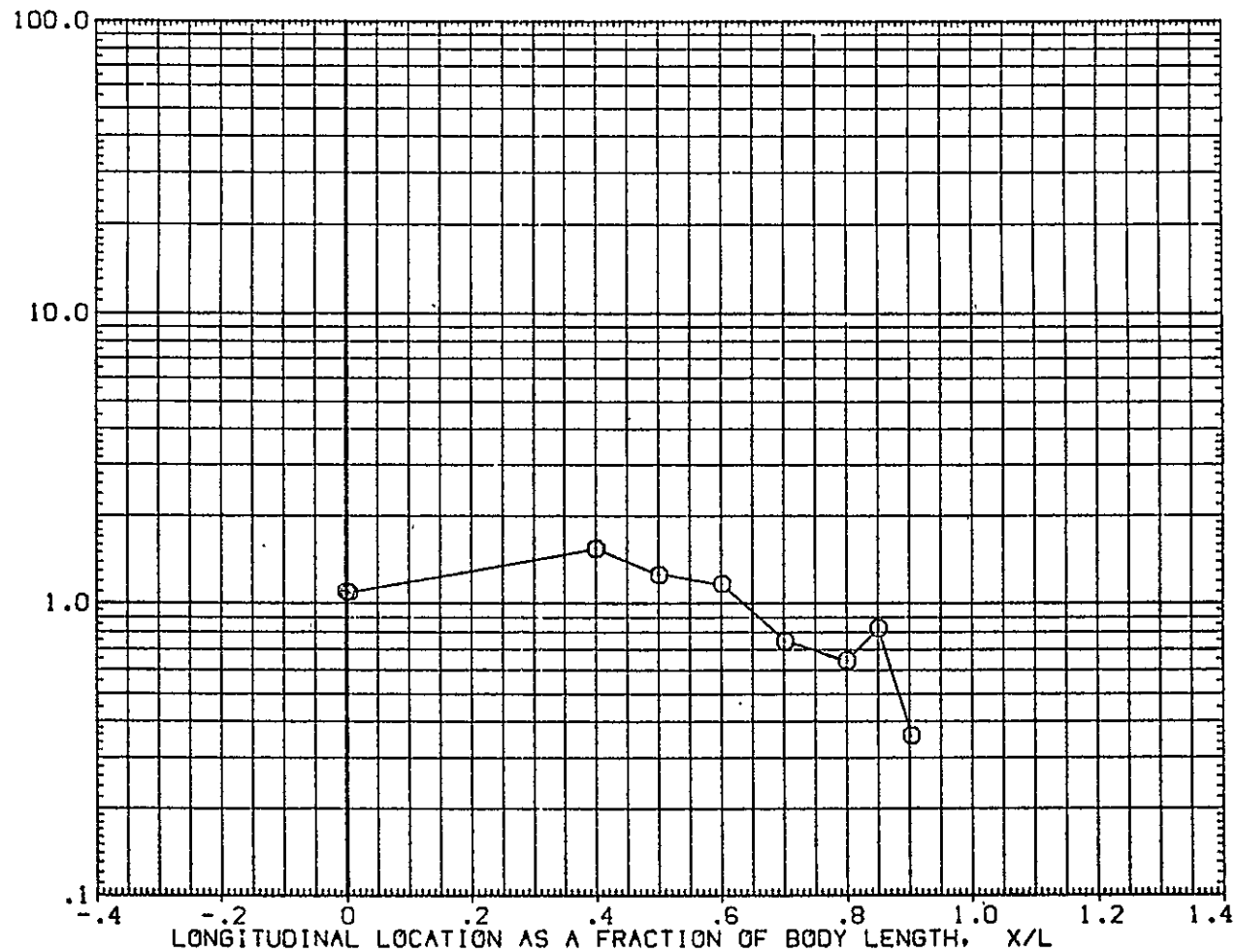


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

OH12 + IH21 MODEL 37 OT-NP(4)/T-NP(3) TANK (IUGT04)

SYMBOL
O HAV/HT .900 PHI 241.000 MACH 18.200

PARAMETRIC VALUES
ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

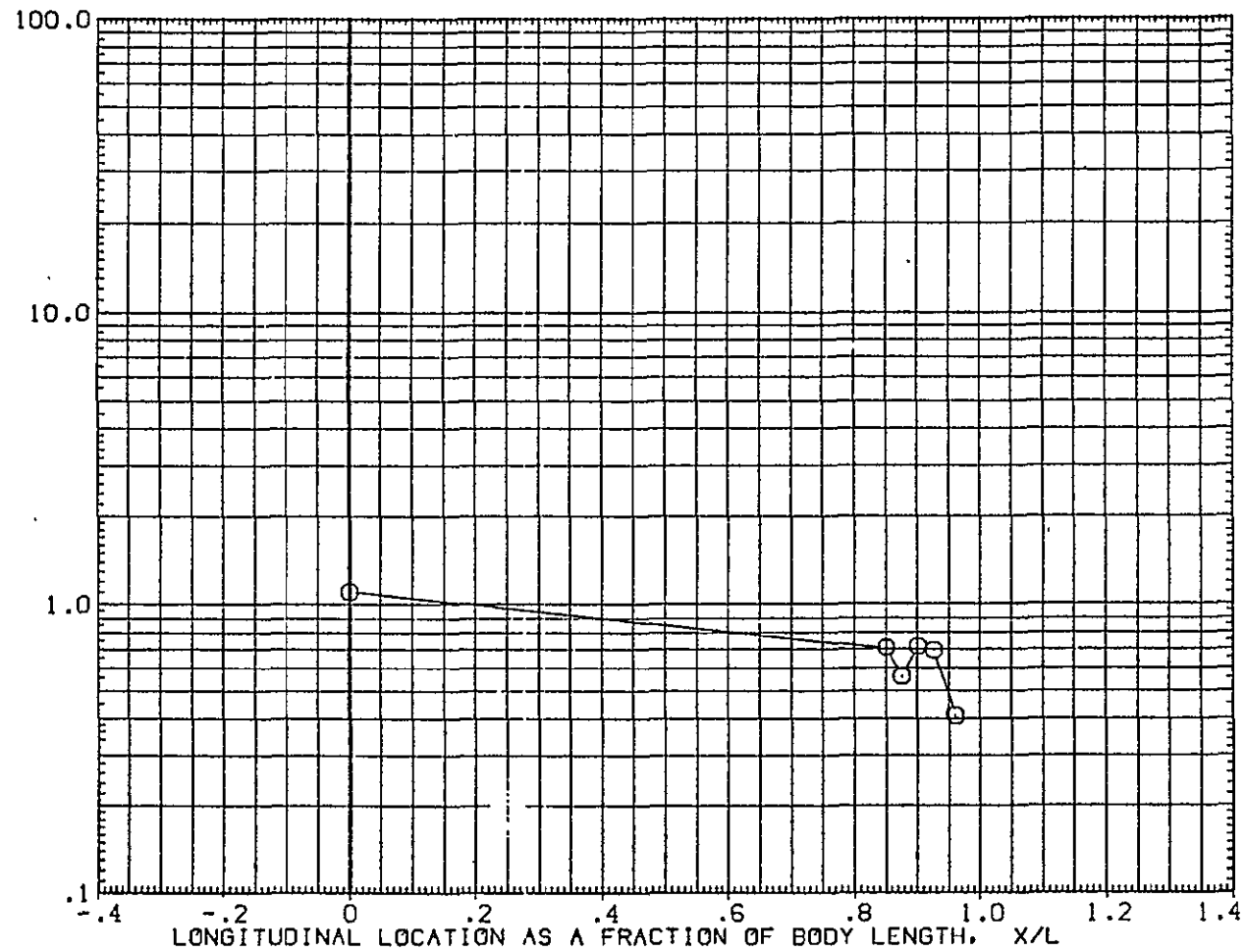


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

OH12 + IH21 MODEL 37 OT-NP(4)/T-NP(3) TANK (IUGTO4)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.900	247.000	18.200	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

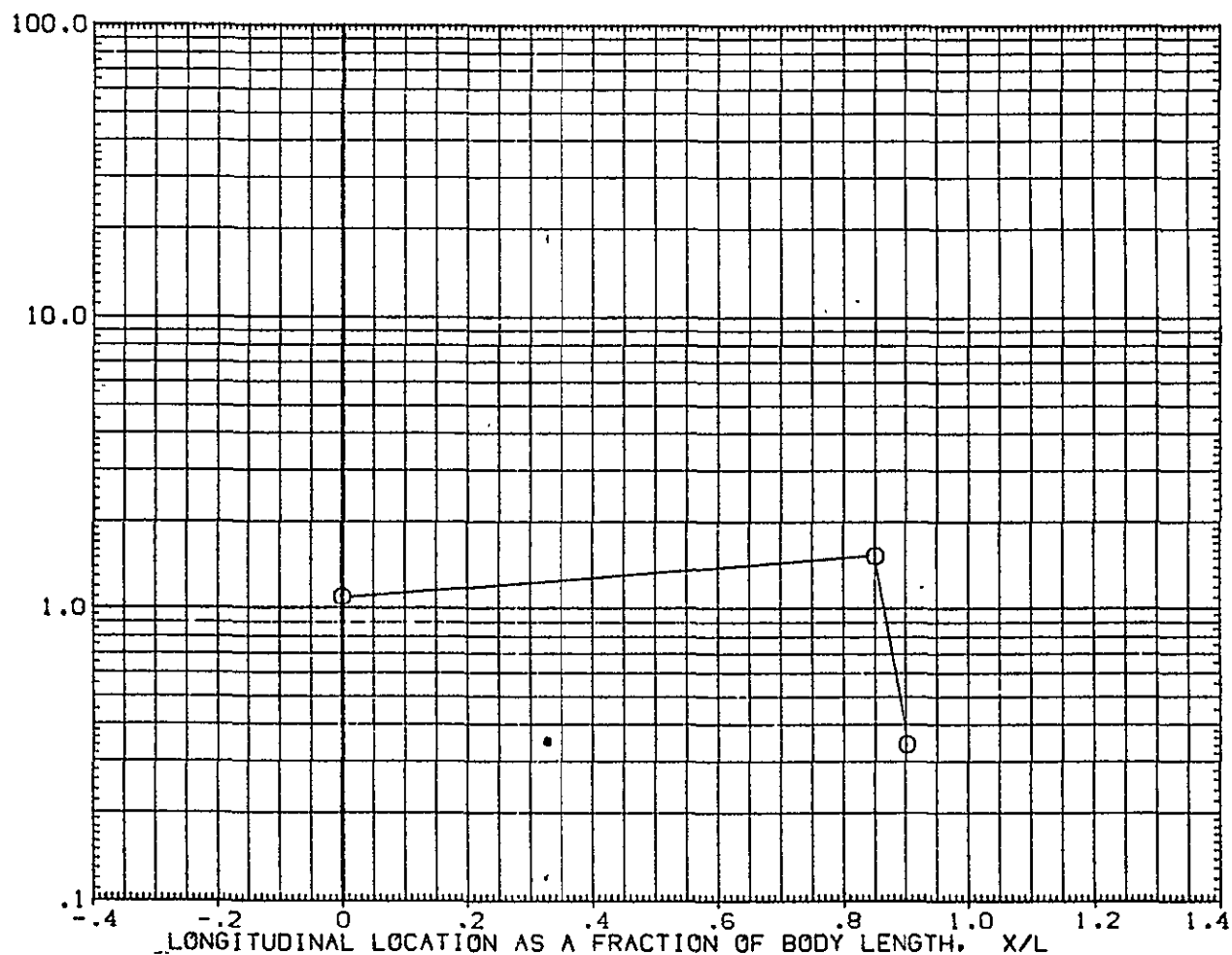


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

OH12 + 1H21 MODEL 37 OT-NP(4)/T-NP(3) TANK (IUGT04)

SYMBOL
O
HAW/HT
.900
PHI
270.000
MACH
18.200

PARAMETRIC VALUES
ALPHA
.000
BETA
.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

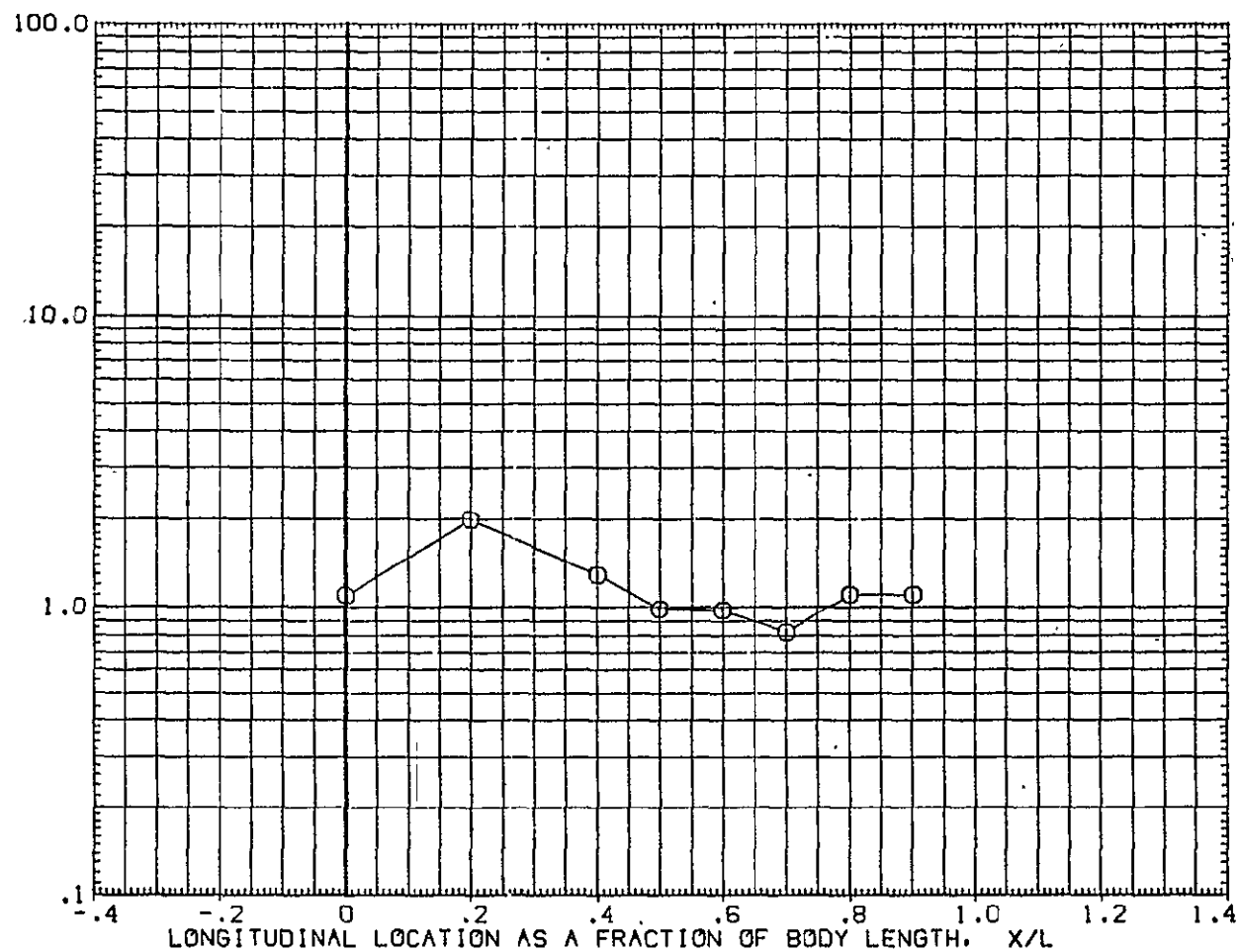


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

OH12 + 1H21 MODEL 37 OT-NP(4)/T-NP(3) TANK (IUGT04)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	
O	.900	315.000	18.200		.000		.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

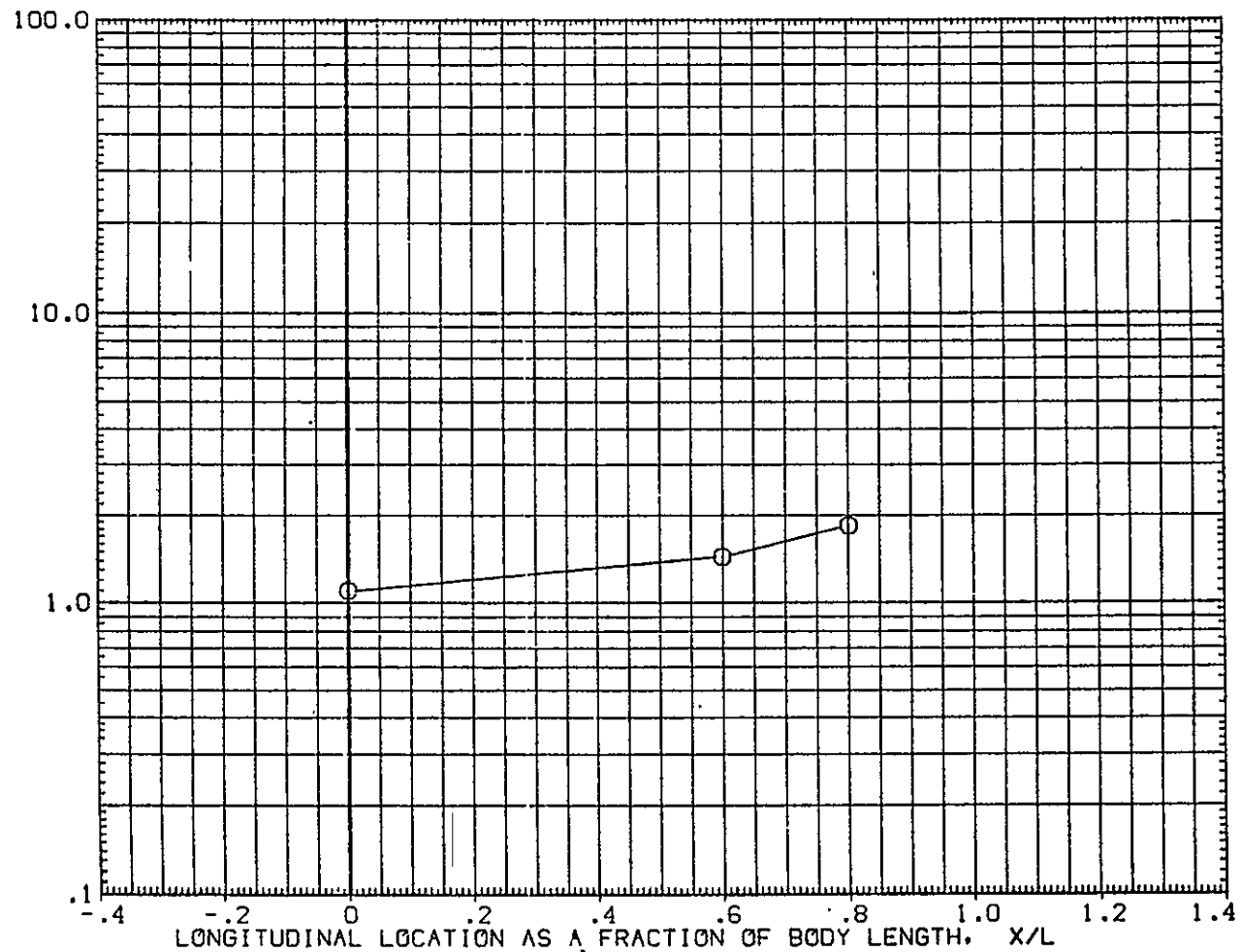


FIG. 6 EFFECT OF RECOVERY FACTOR ON E. TANK HEAT TRANSFER WITHOUT PROTUBERANCES

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	OH12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	OH12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

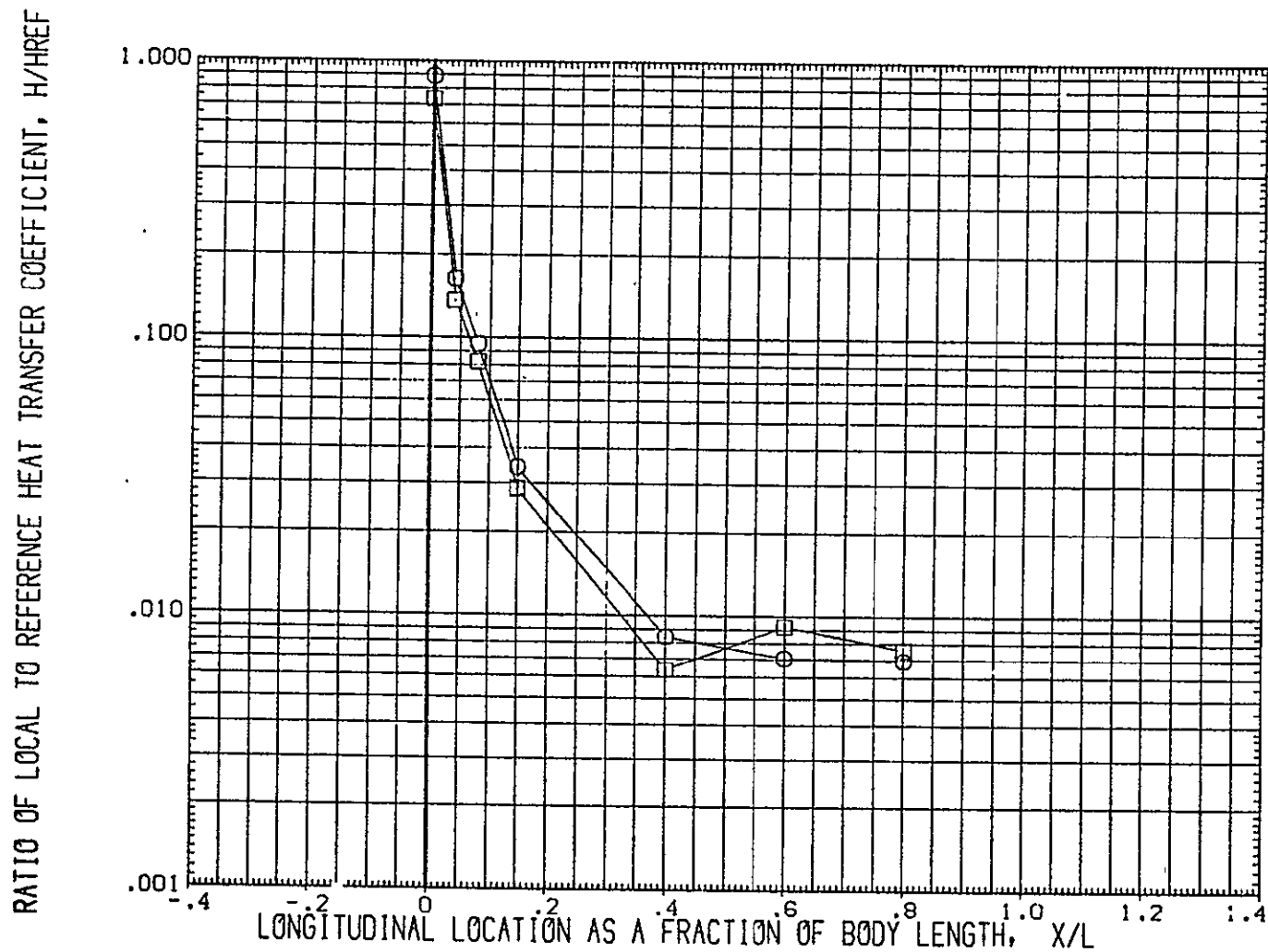


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0
MACH = 18.400 HAW/HT = .850 PHI = .000

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	OH12/H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	OH12/H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

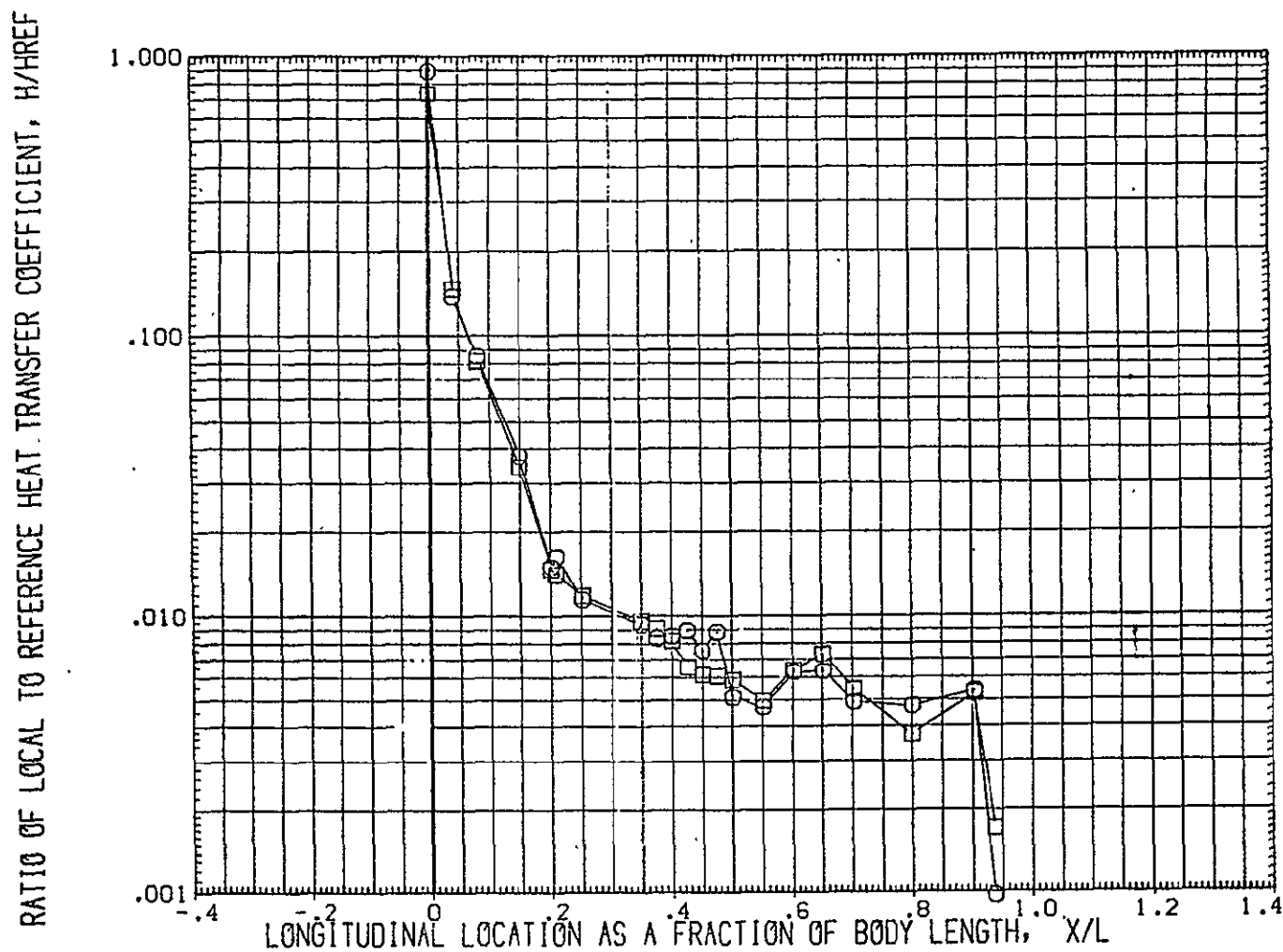


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0
MACH = 18.400 HAW/HT = .850 PHI = 180.000 PAGE 154

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	0412/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	0412/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

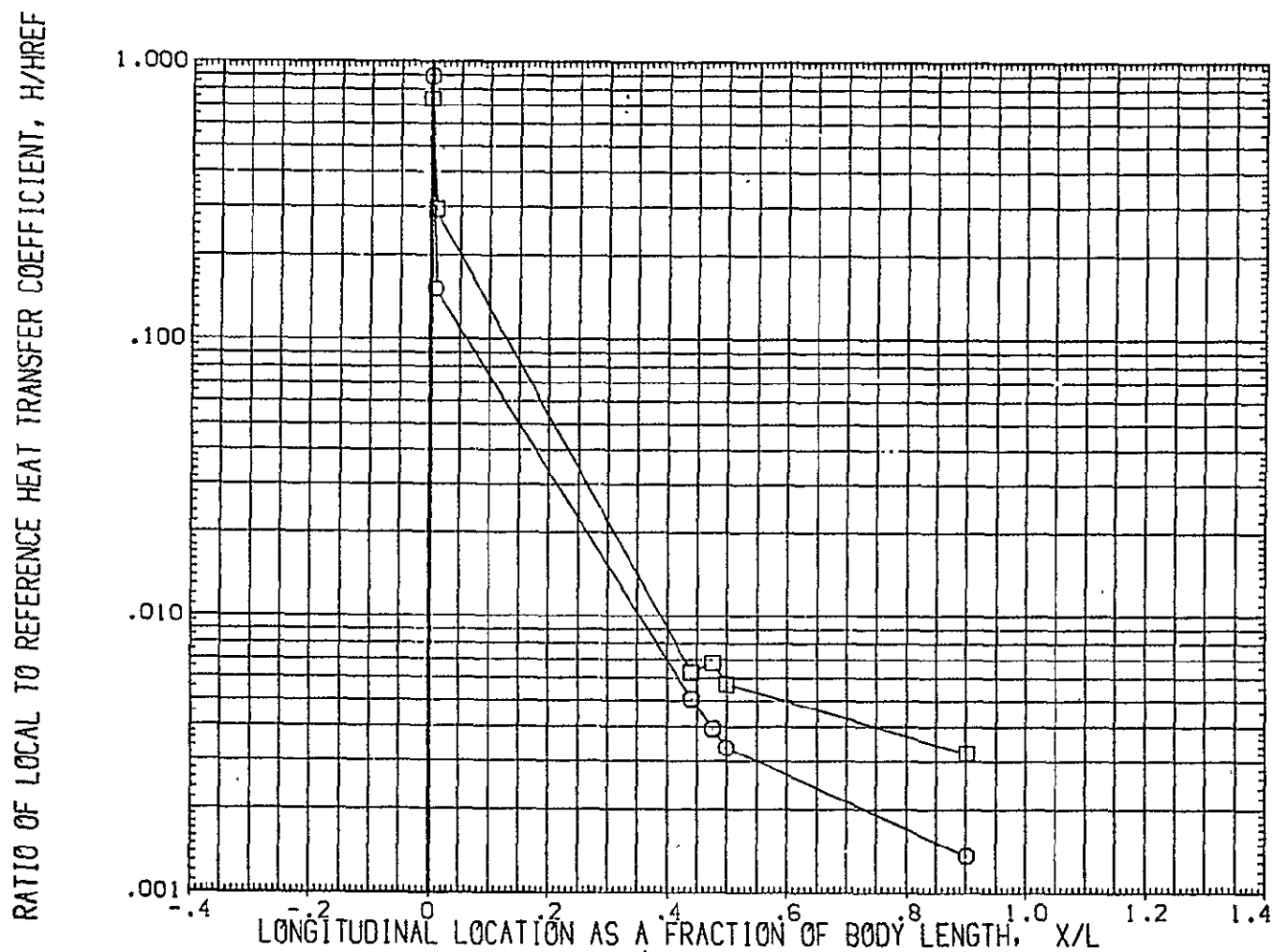


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0
MACH = 18.400 HAW/HT = .850 PHI = 199.000 PAGE 155

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	OH12/IH21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	OH12/IH21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

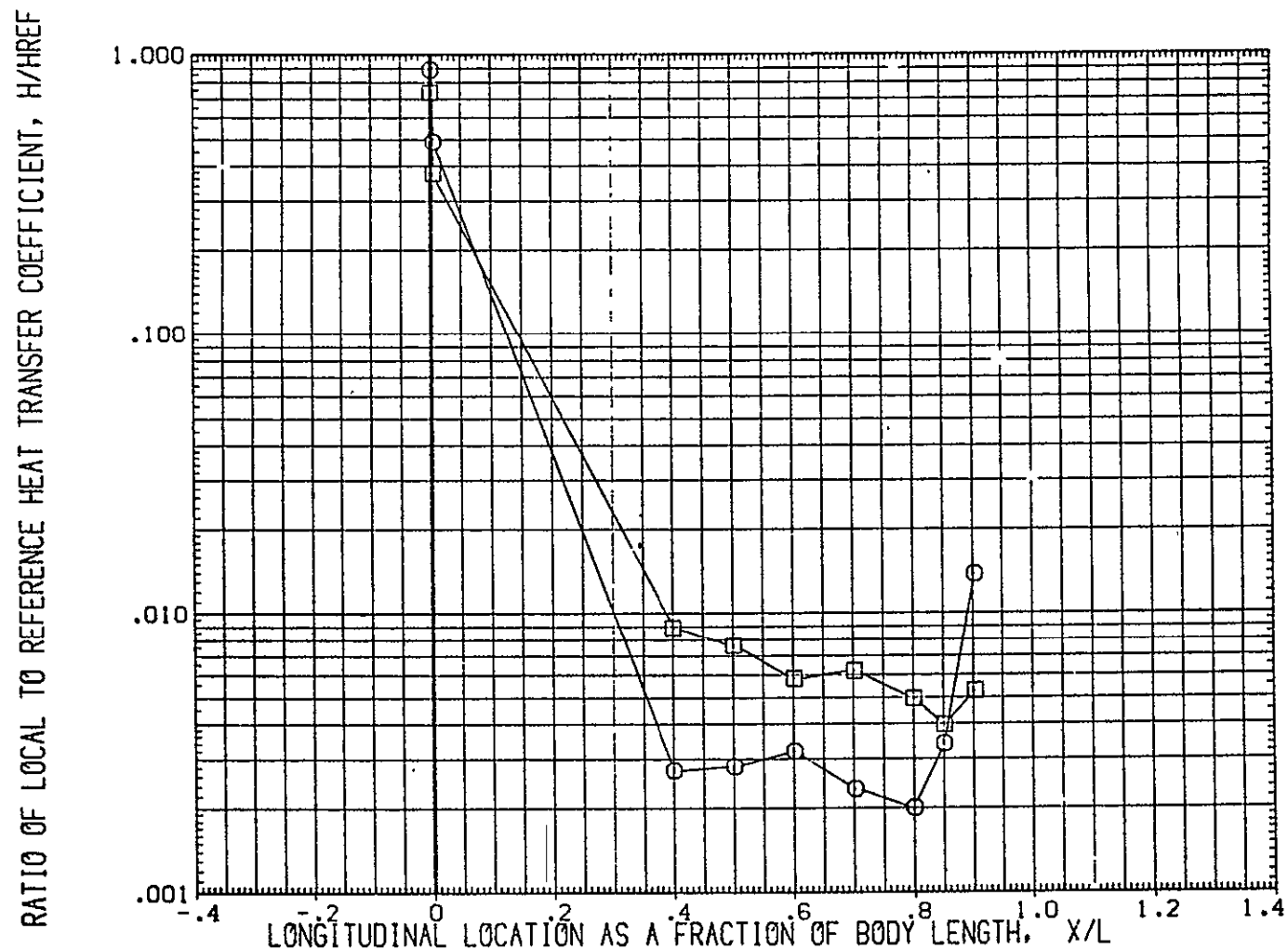


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

MACH = 18.400 HAW/HT = .850 PHI = 221.000

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	CH12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	CH12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

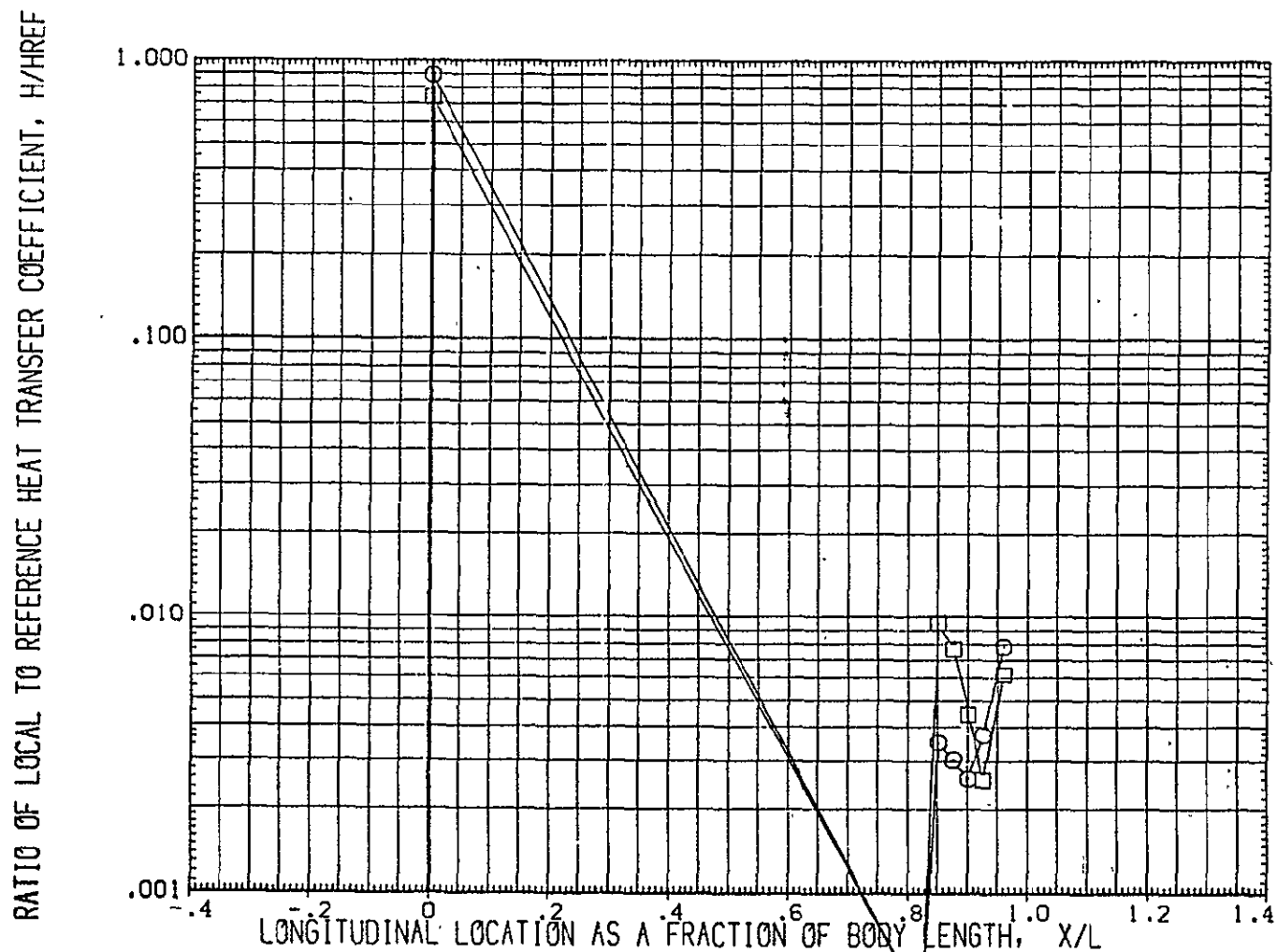


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0
MACH = 18.400 HAW/HT = .850 PHI = 241.000
PAGE 157

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	OH12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	OH12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

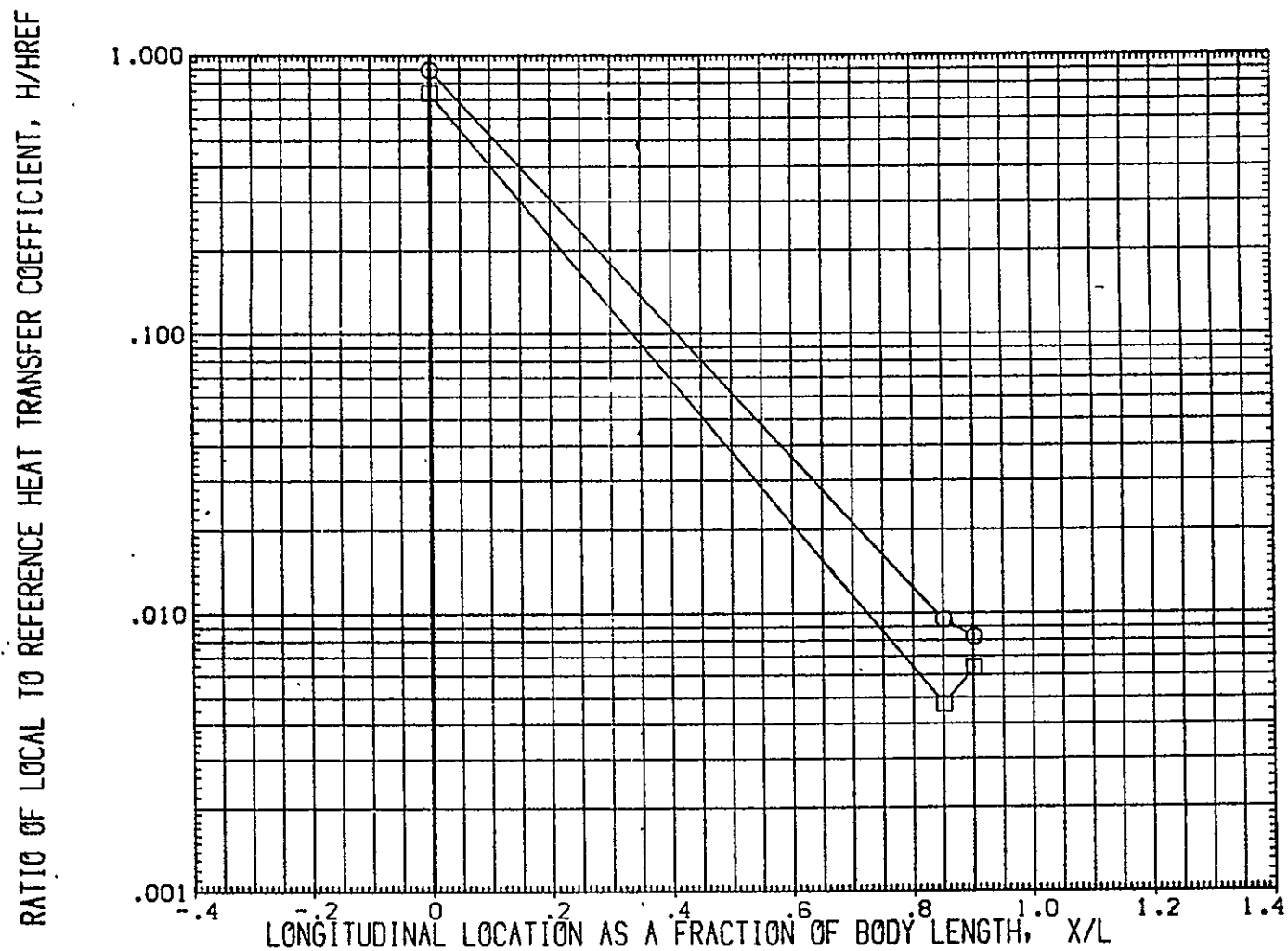


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0
MACH = 18.400 HAW/HT = .850 PHI = 247.000 PAGE 158

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ORIGINAL PAGE IS POOR

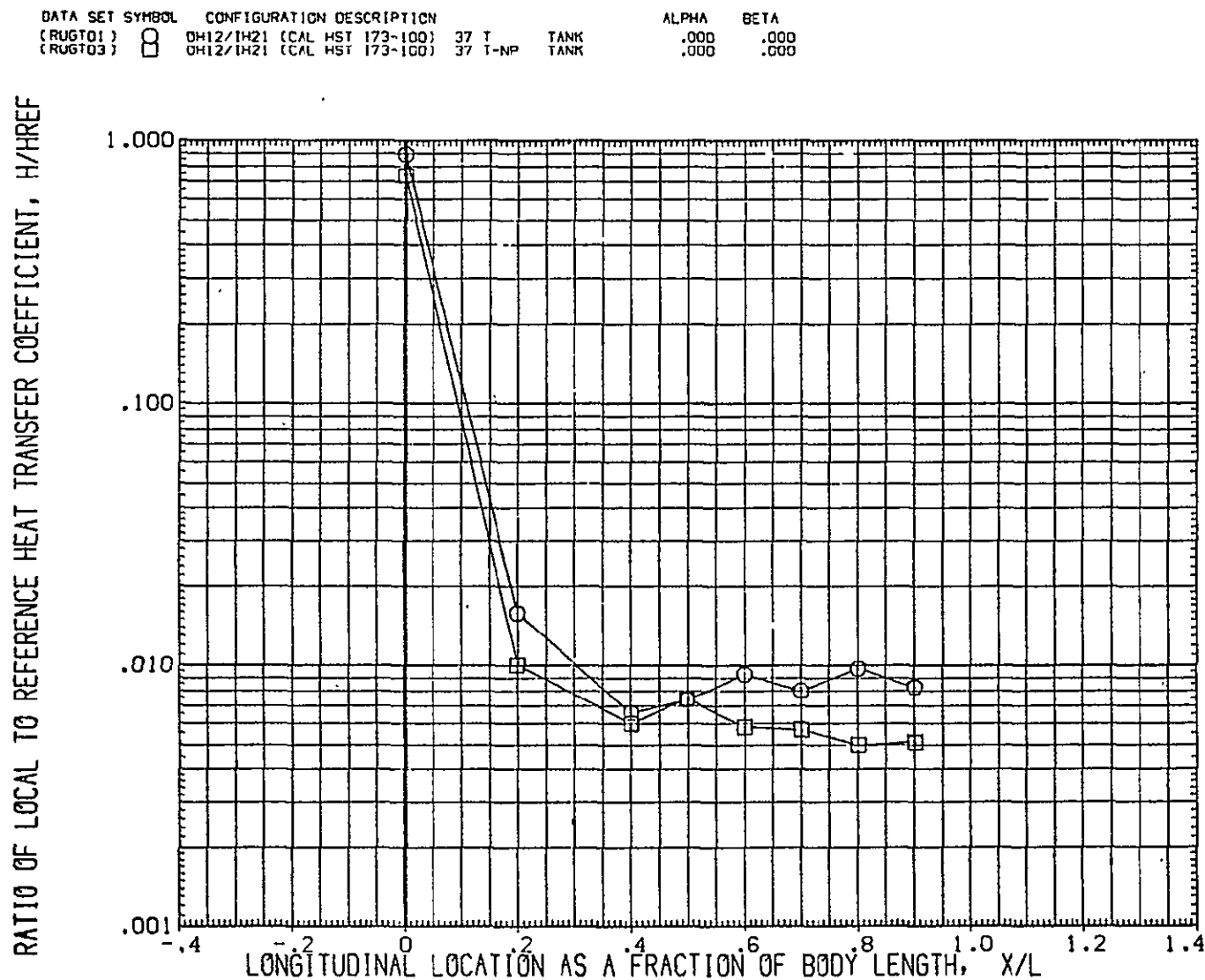


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER · ALPHA = 0
MACH = 18.400 HAW/HT = .850 PHI = 270.000 PAGE 159

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	OH12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	OH12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

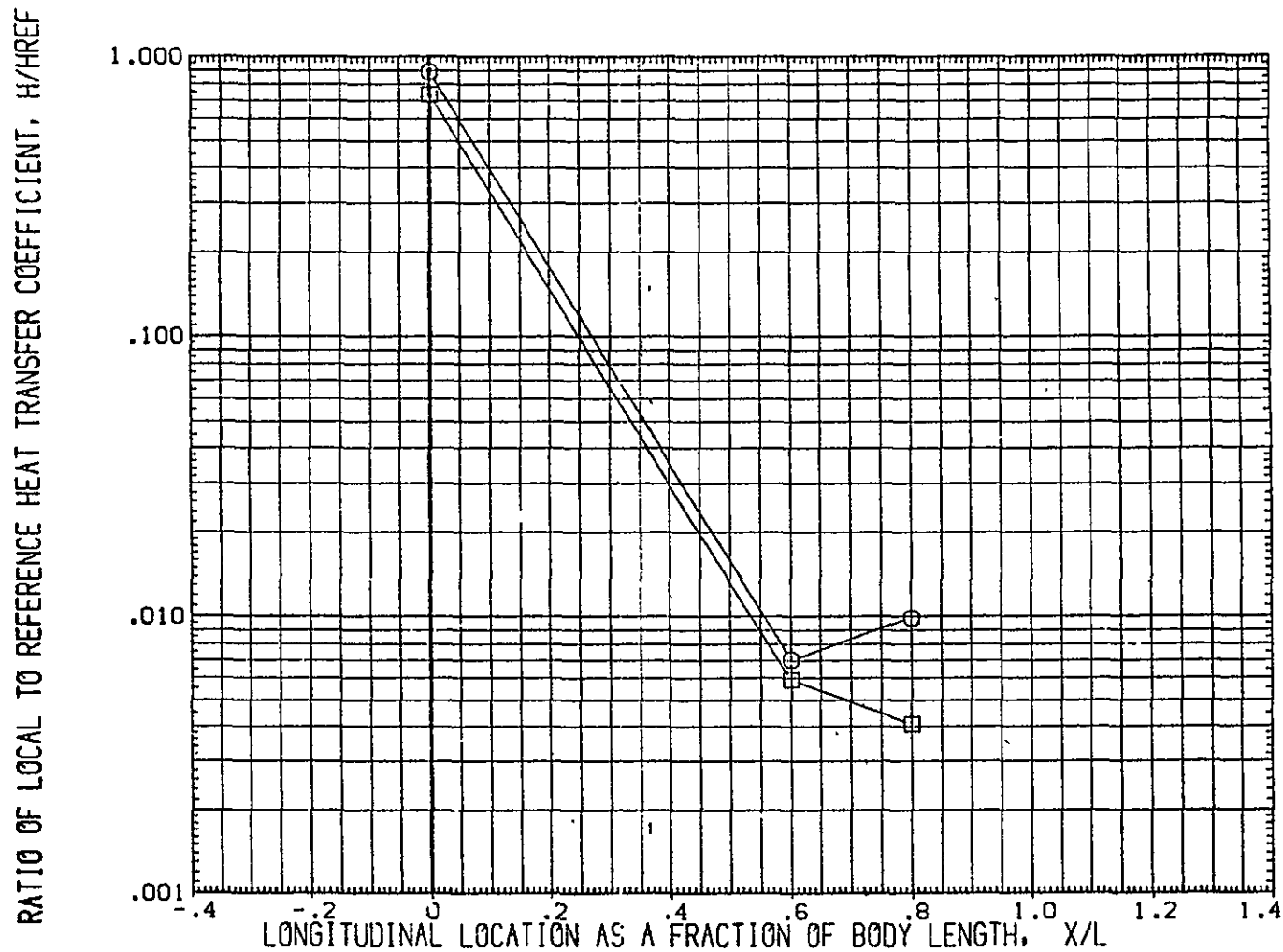


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

MACH = 18.400 HAW/HT= .850 PHI = 315.000

PAGE 160

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	CH12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	CH12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

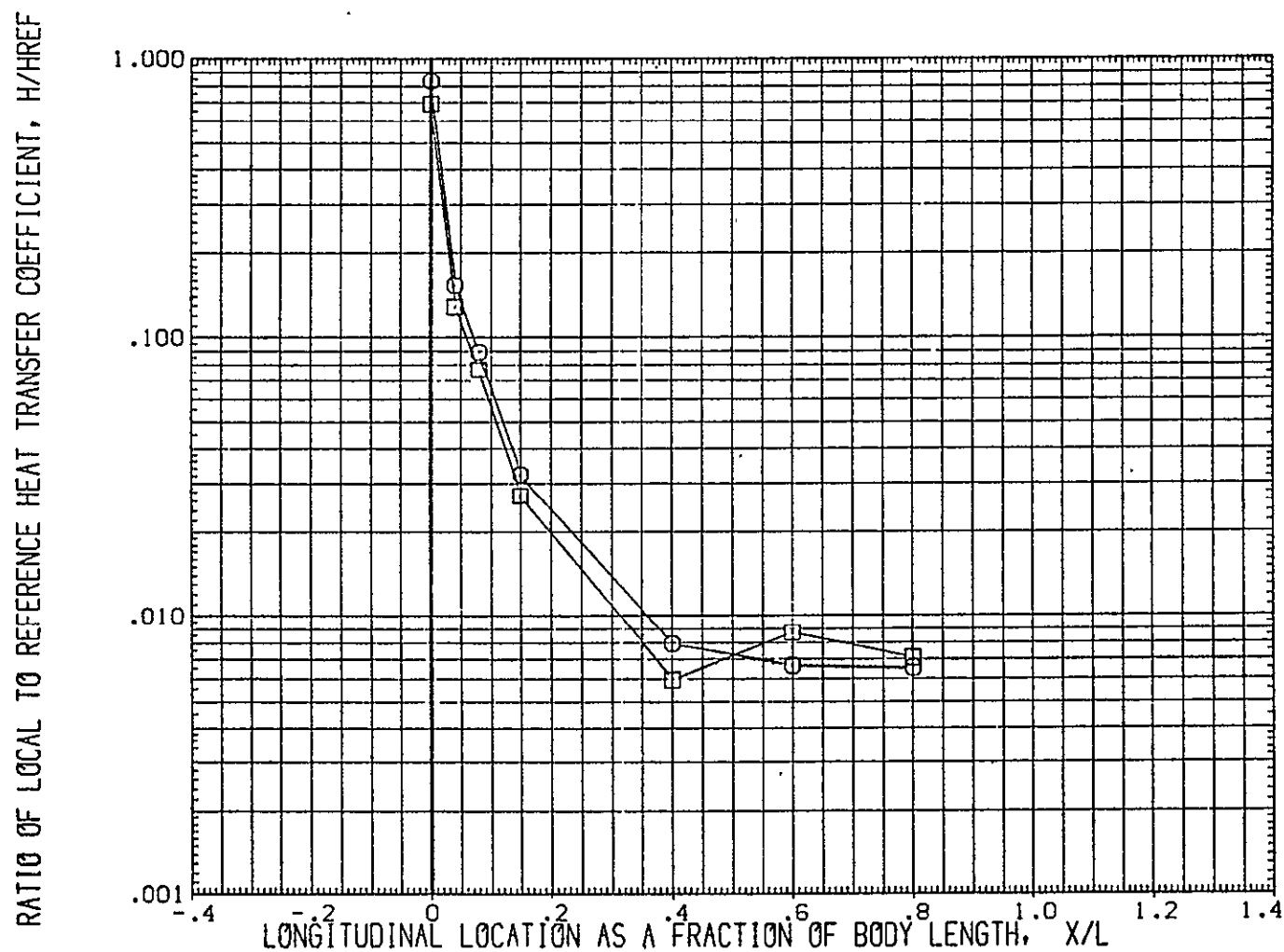


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

MACH = 18.400 HAW/HT = .900 PHI = .000

PAGE 161

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	OH12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	OH12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

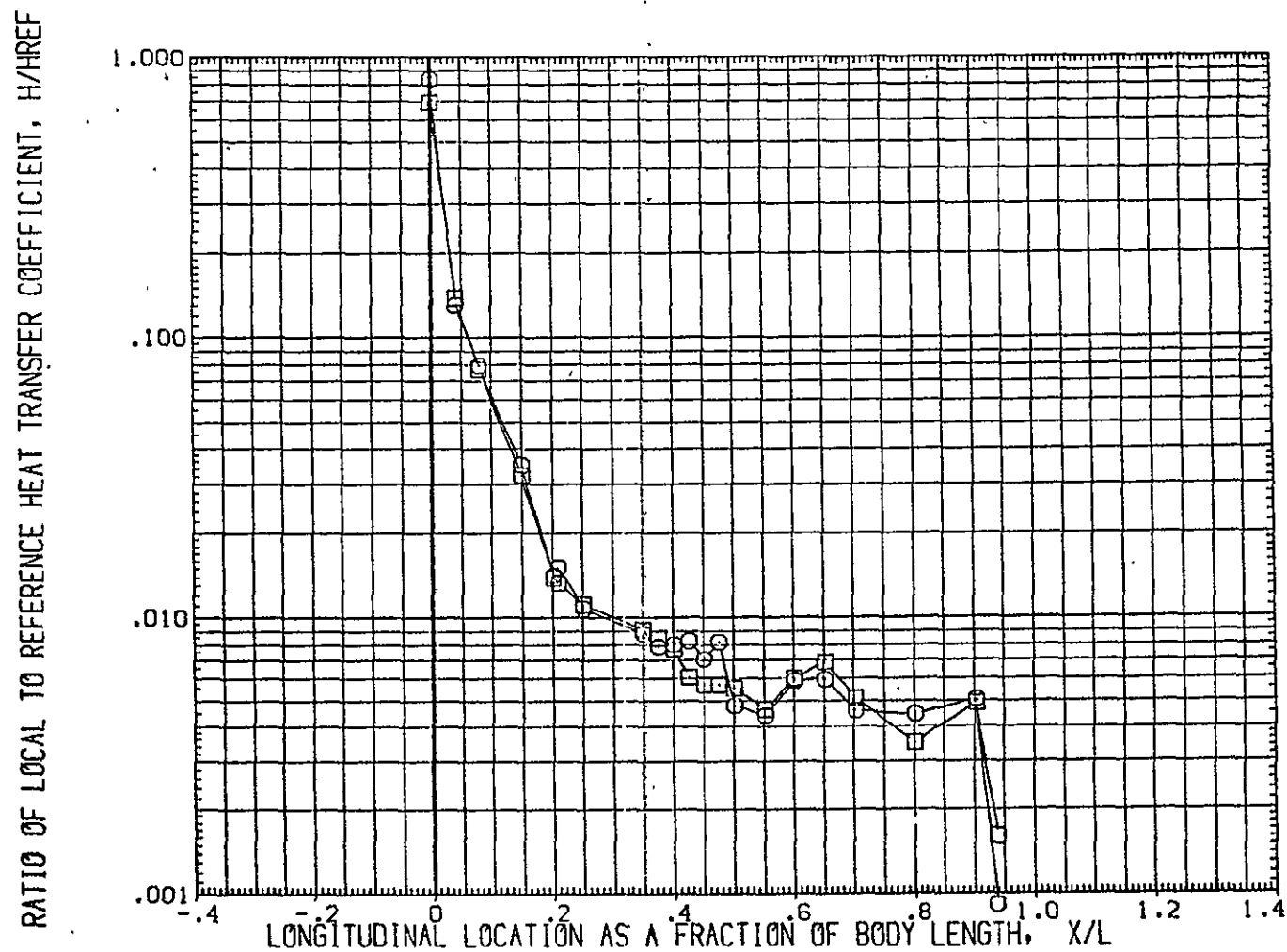


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

MACH = 18.400 HAW/HT = .900 PHI = 180.000

PAGE 162

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	CH12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	CH12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

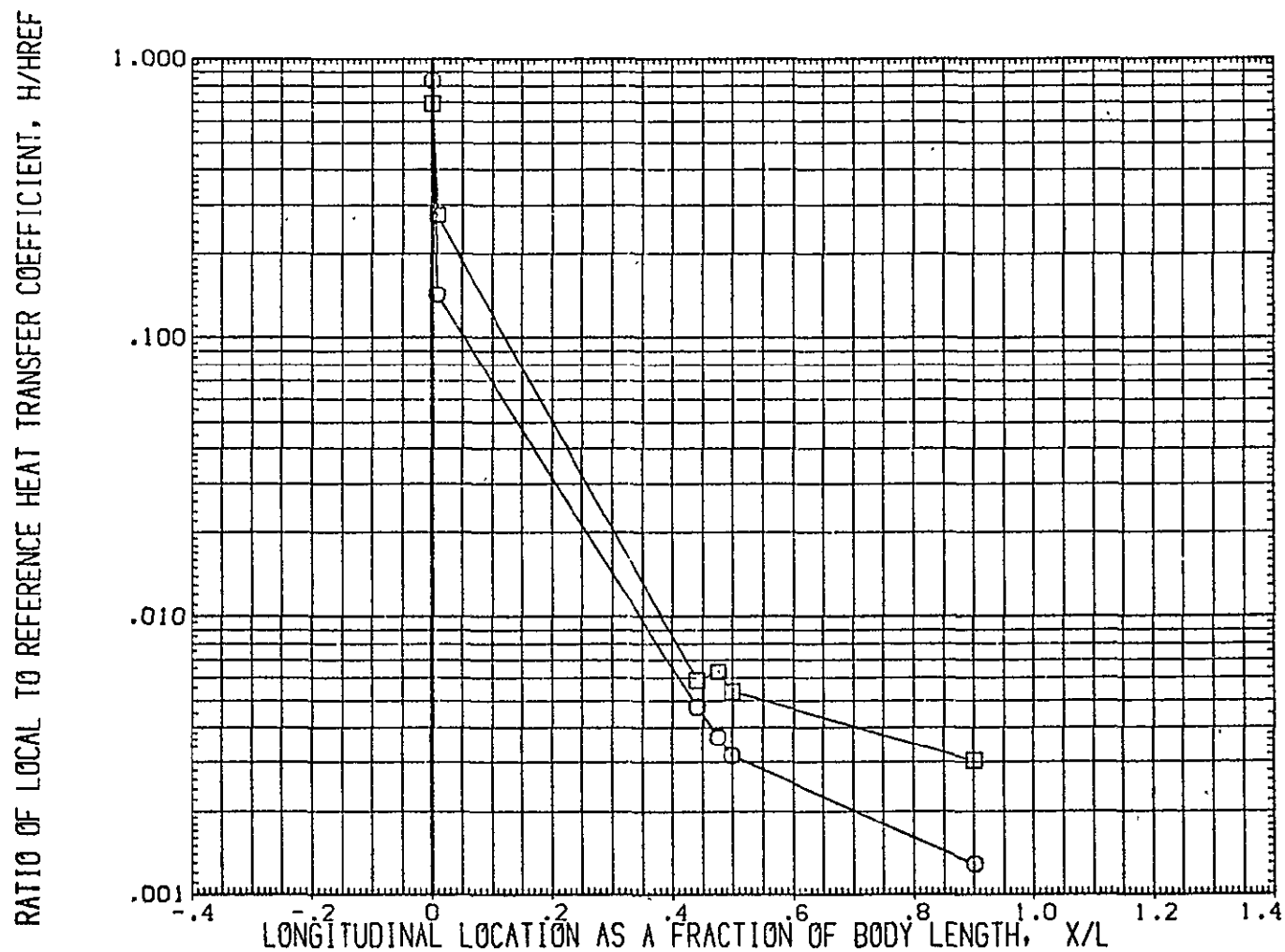


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

MACH = 18.400 HAW/HT = .900 PHI = 199.000

PAGE 163

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	OH12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	OH12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

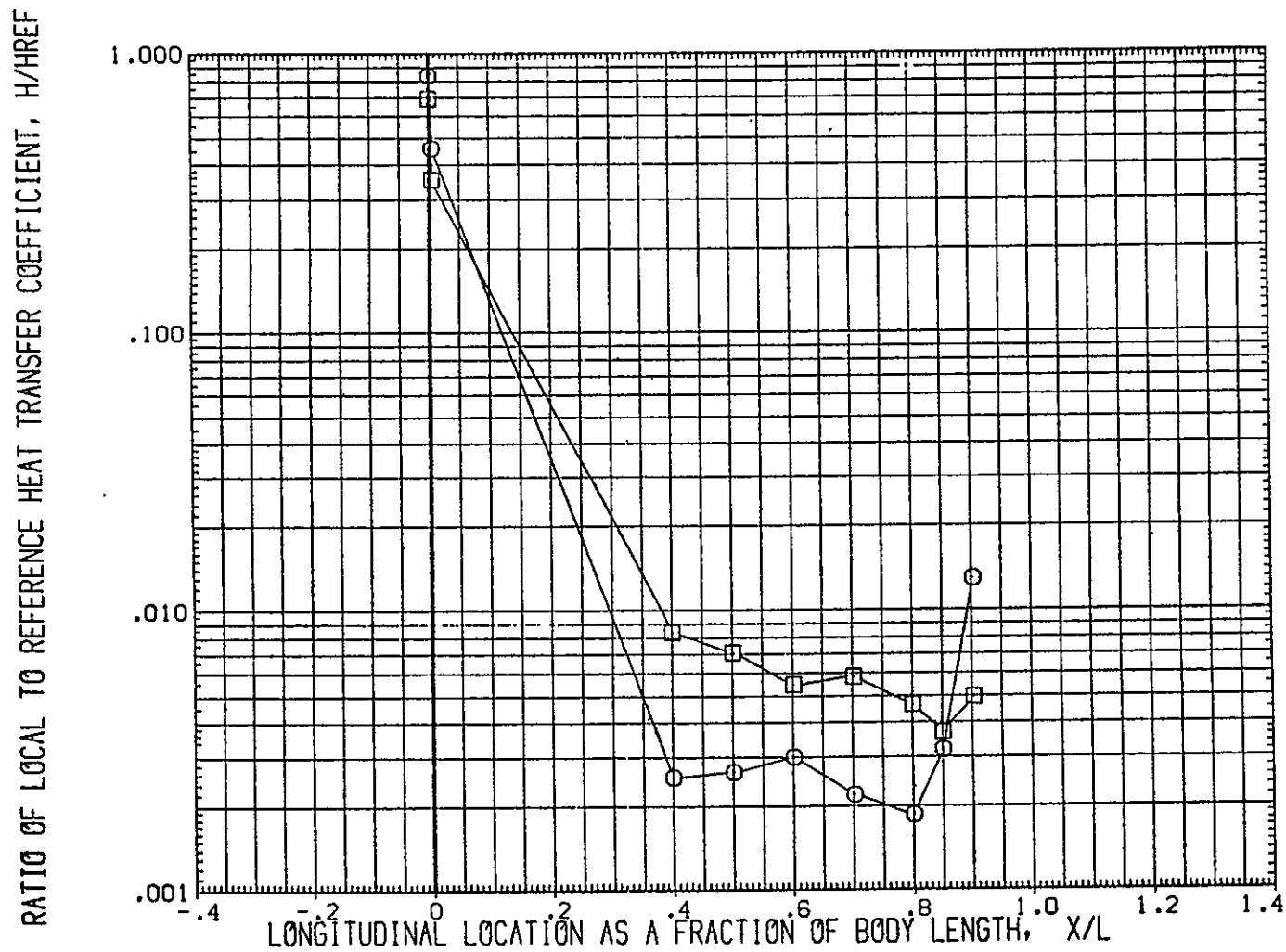


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

MACH = 18.400 HAW/HT = .900 PHI = 221.000

PAGE 164

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	0H12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	0H12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

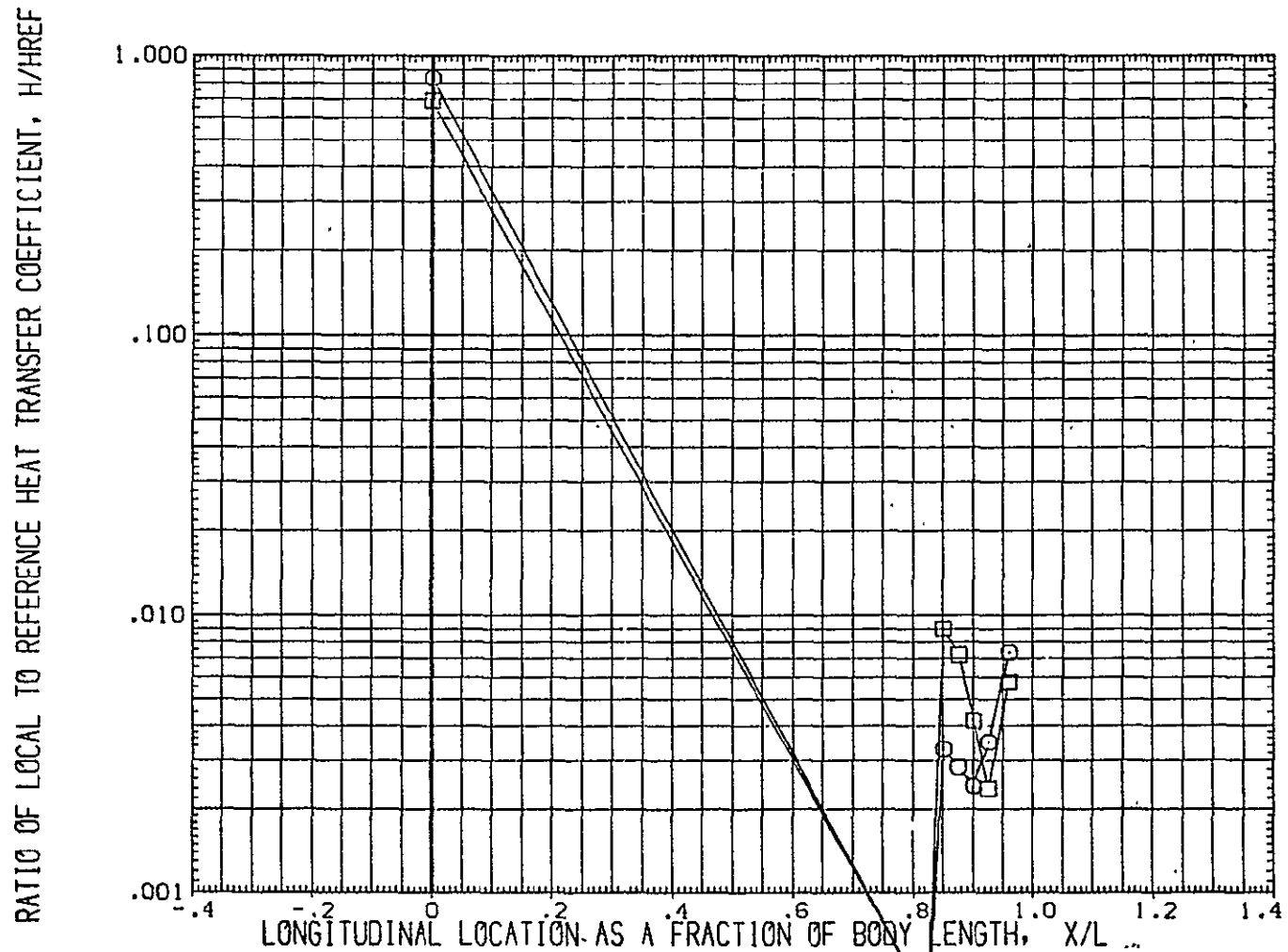


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

MACH = 18.400 HAW/HT = .900 PHI = 241.000

PAGE 165

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUST01)	CH12/IH21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUST03)	CH12/IH21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

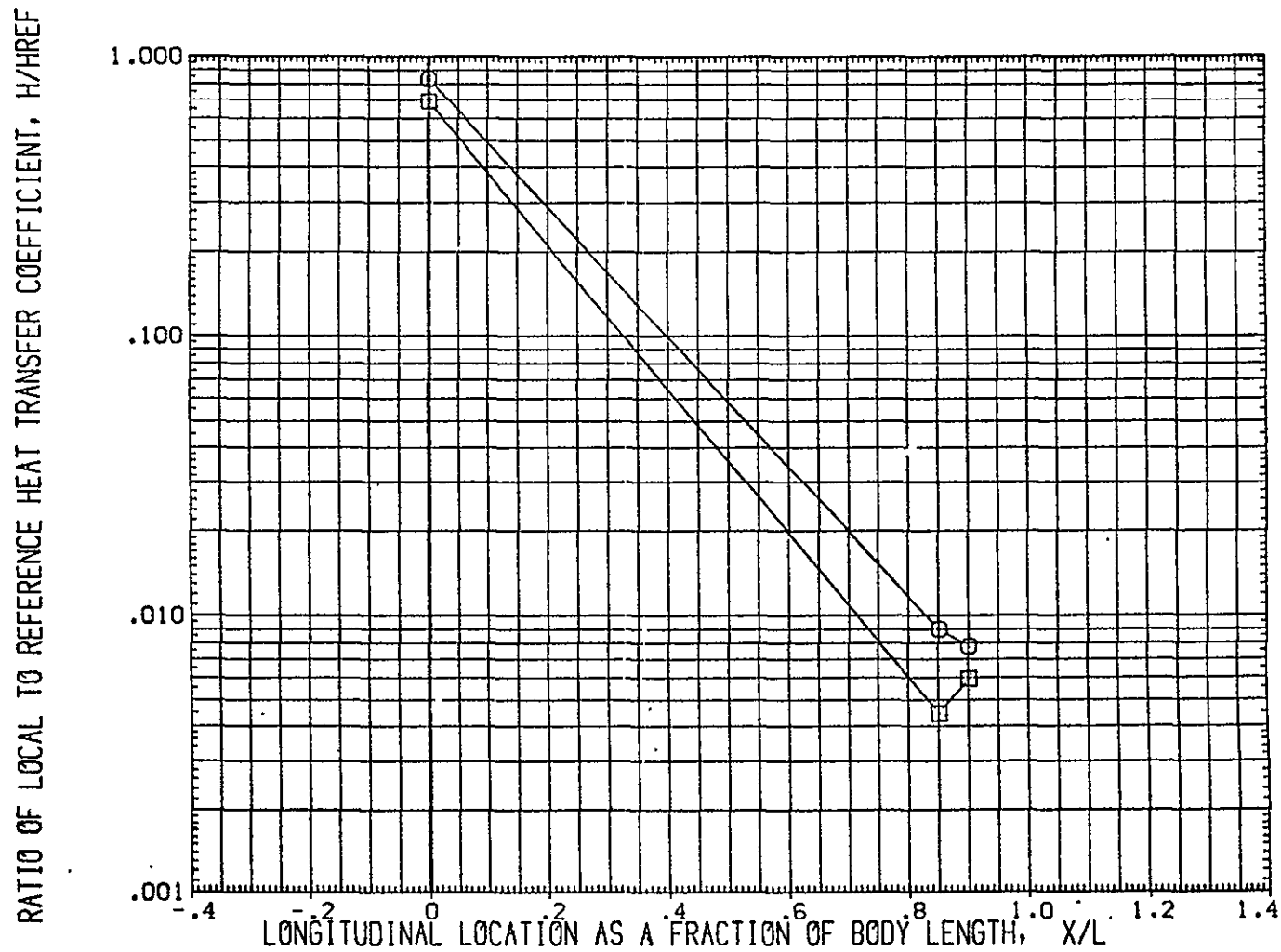


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0
MACH = 18.400 HAW/HT = .900 PHI = 247.000 PAGE 166

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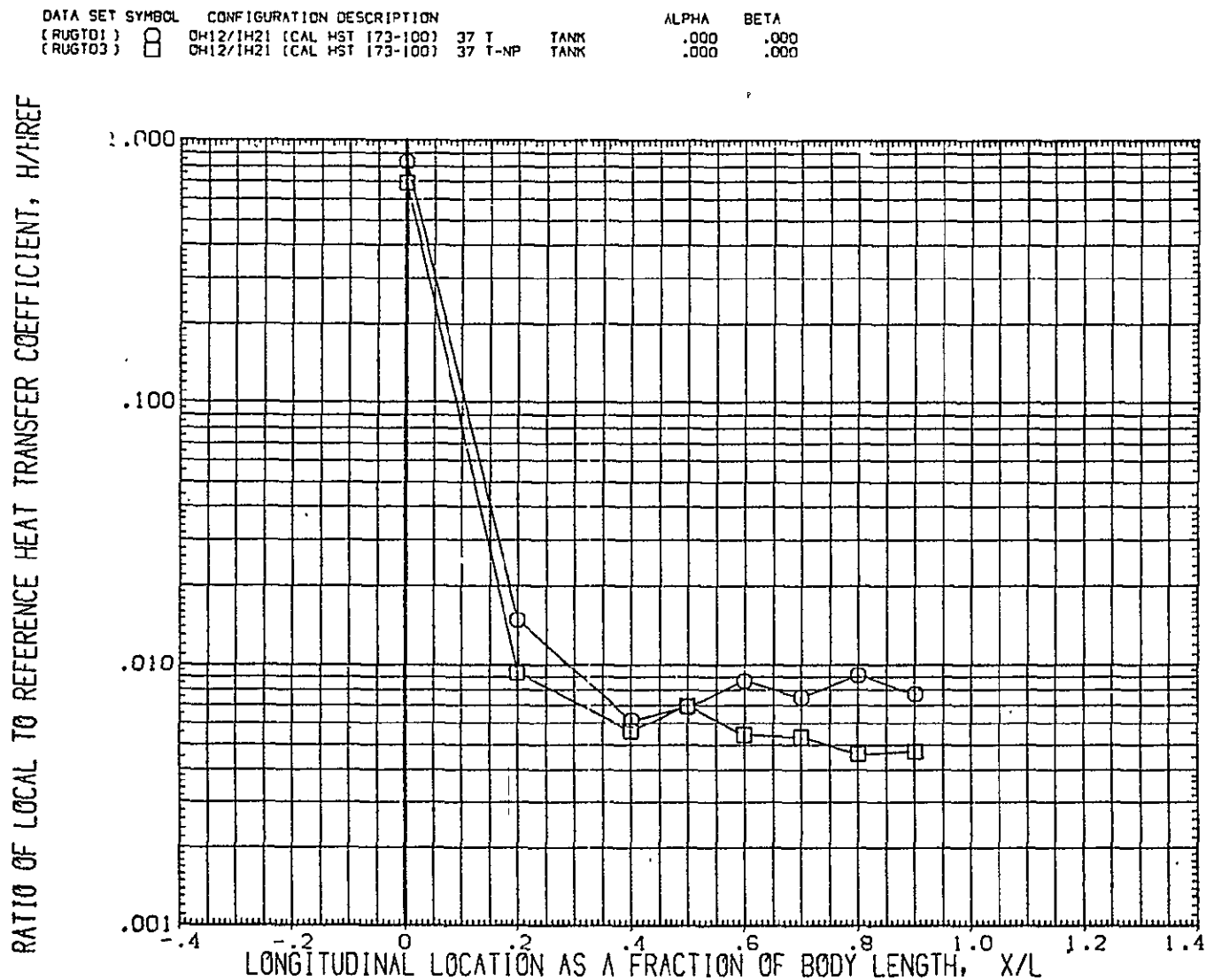


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER: ALPHA = 0
MACH = 18.400 HAW/HT = .900 PHI = 270.000 PAGE 167

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	OH12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	OH12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

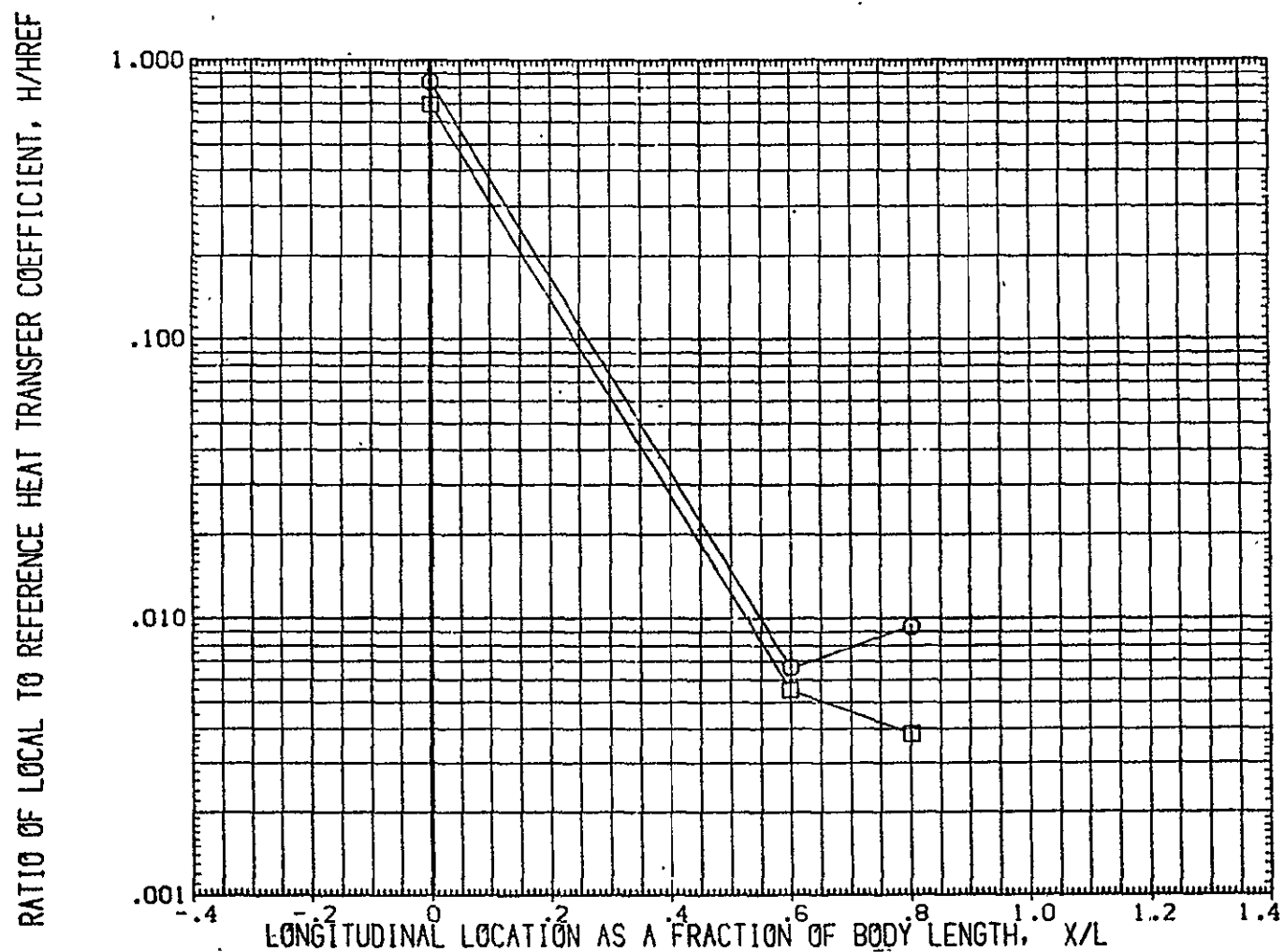


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0
MACH = 18.400 HAW/HT = .900 PHI = 315.000 PAGE 168

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	OH12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	OH12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

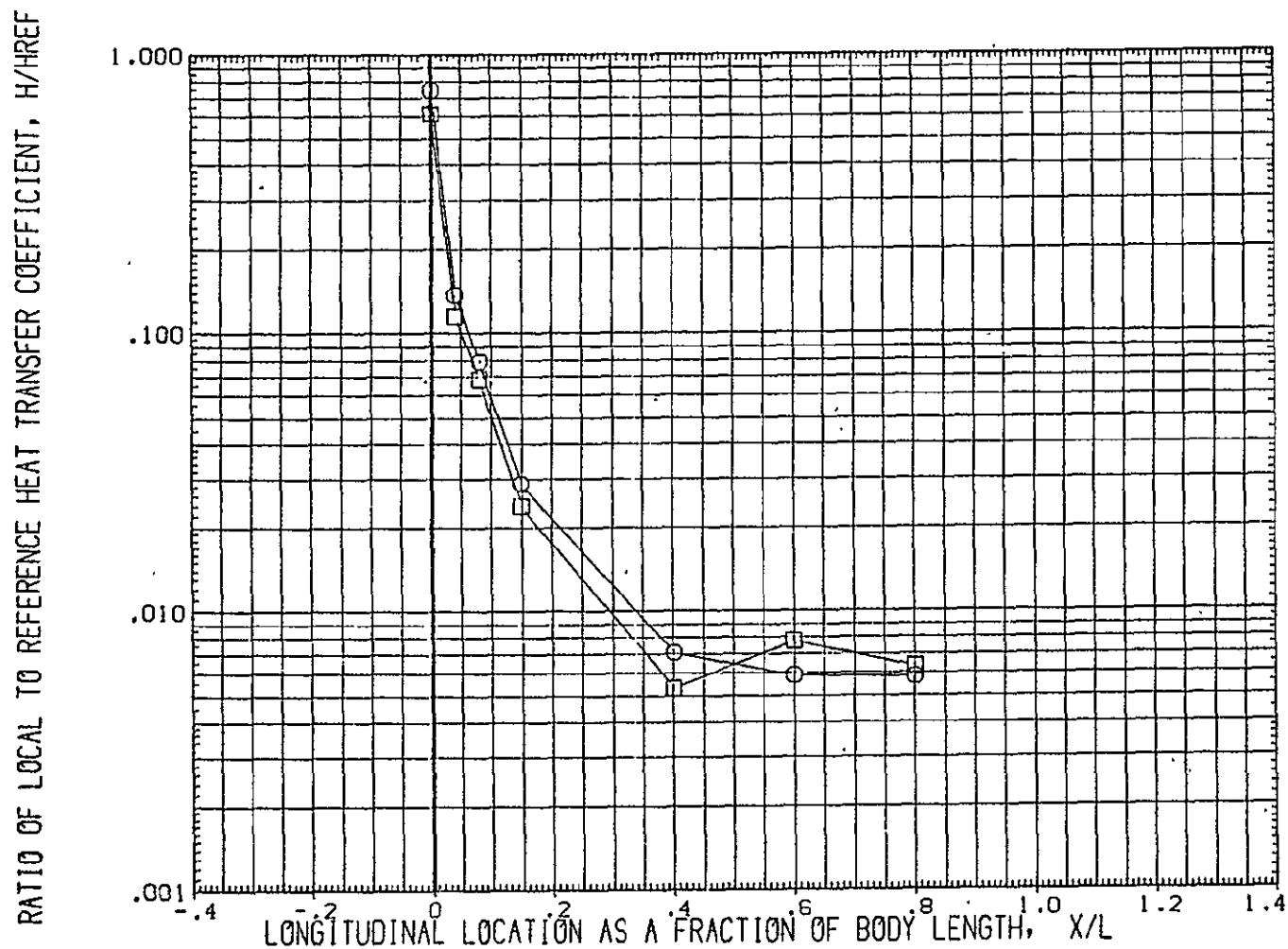


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

MACH = 18.400 HAW/HT = 1.000 PHI = .000

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	OH12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	OH12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

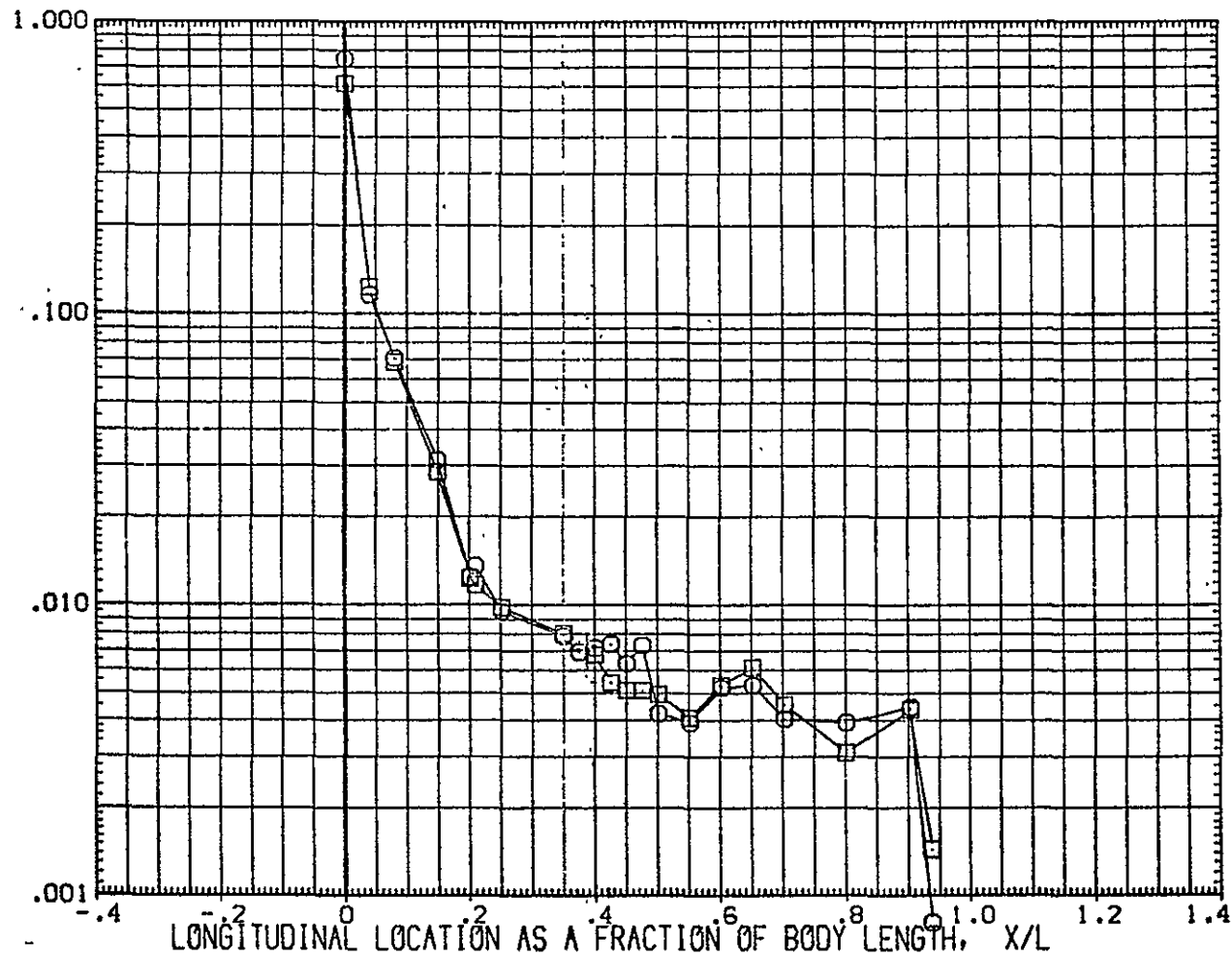


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

MACH = 18.400 HAW/HT= 1.000 PHI = 180.000

PAGE 170

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	0M12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	0M12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

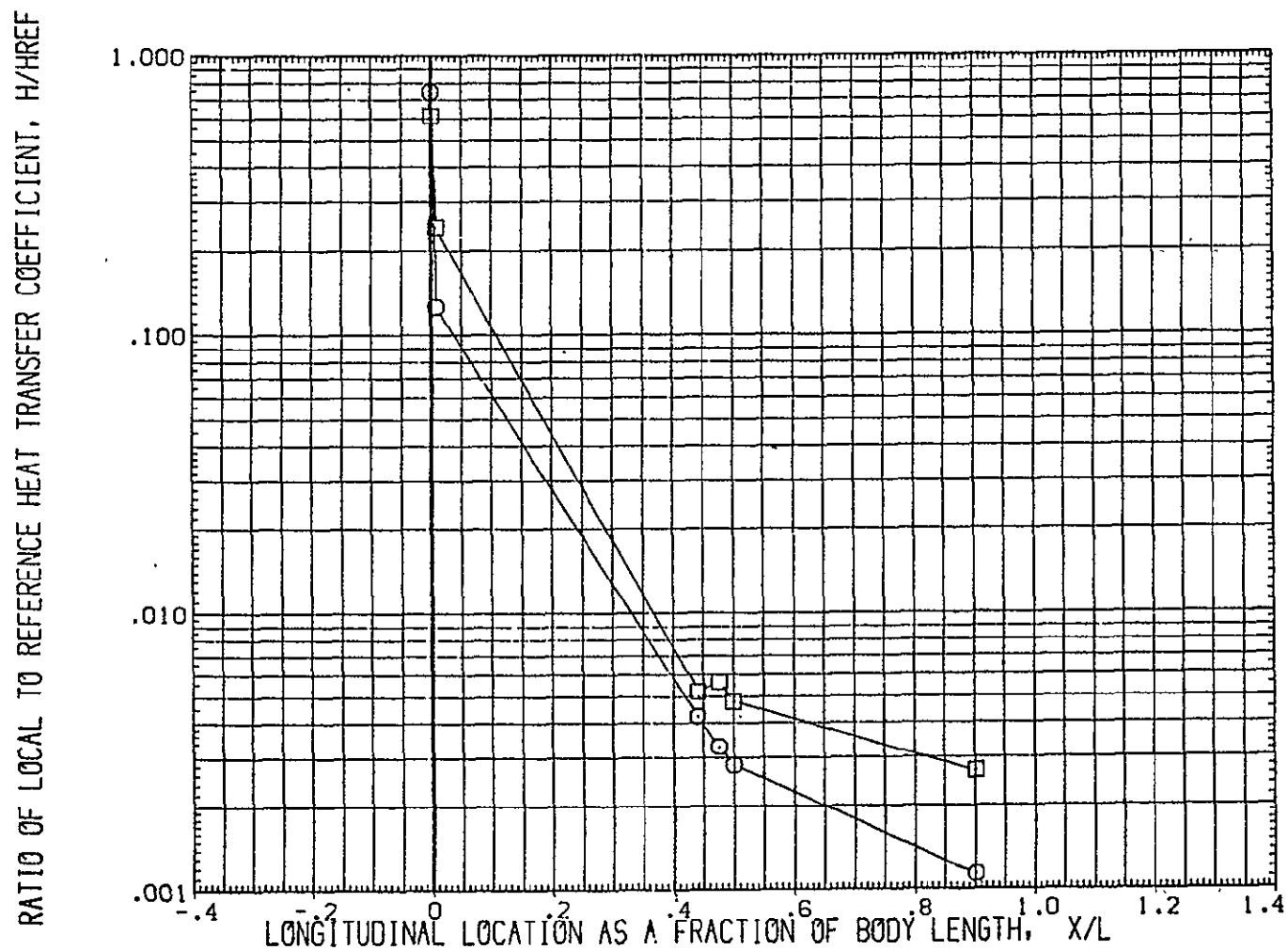


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0
MACH = 18.400 HAW/HT = 1.000 PHI = 199.000 PAGE 171

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	CH12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	CH12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

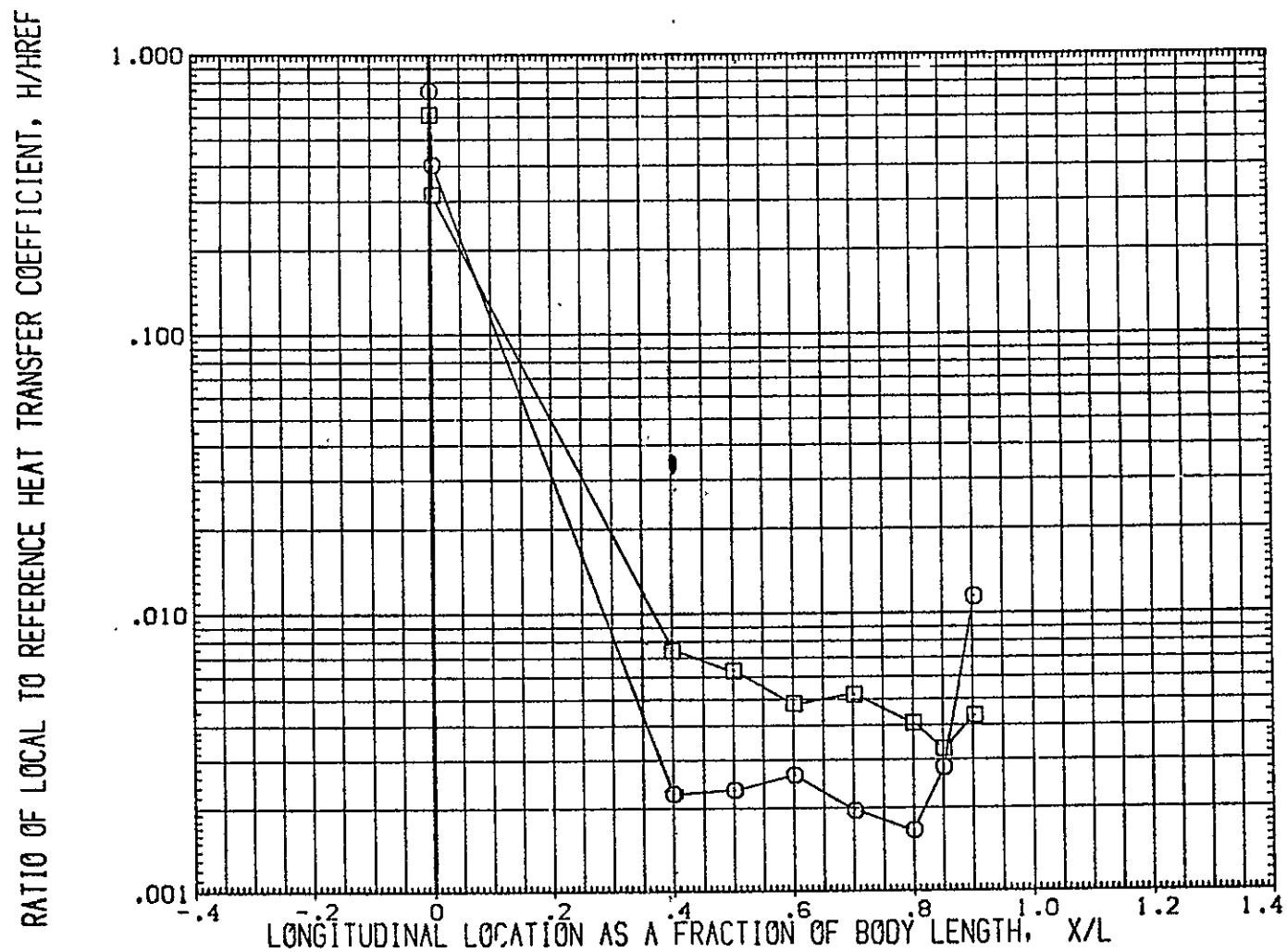


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0
MACH = 18.400 HAW/HT = 1.000 PHI = 221.000 PAGE 172

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	OH12/H21 (CAL HST [73-100] 37 T TANK	.000	.000
(RUGT03)	OH12/H21 (CAL HST [73-100] 37 T-NP TANK	.000	.000

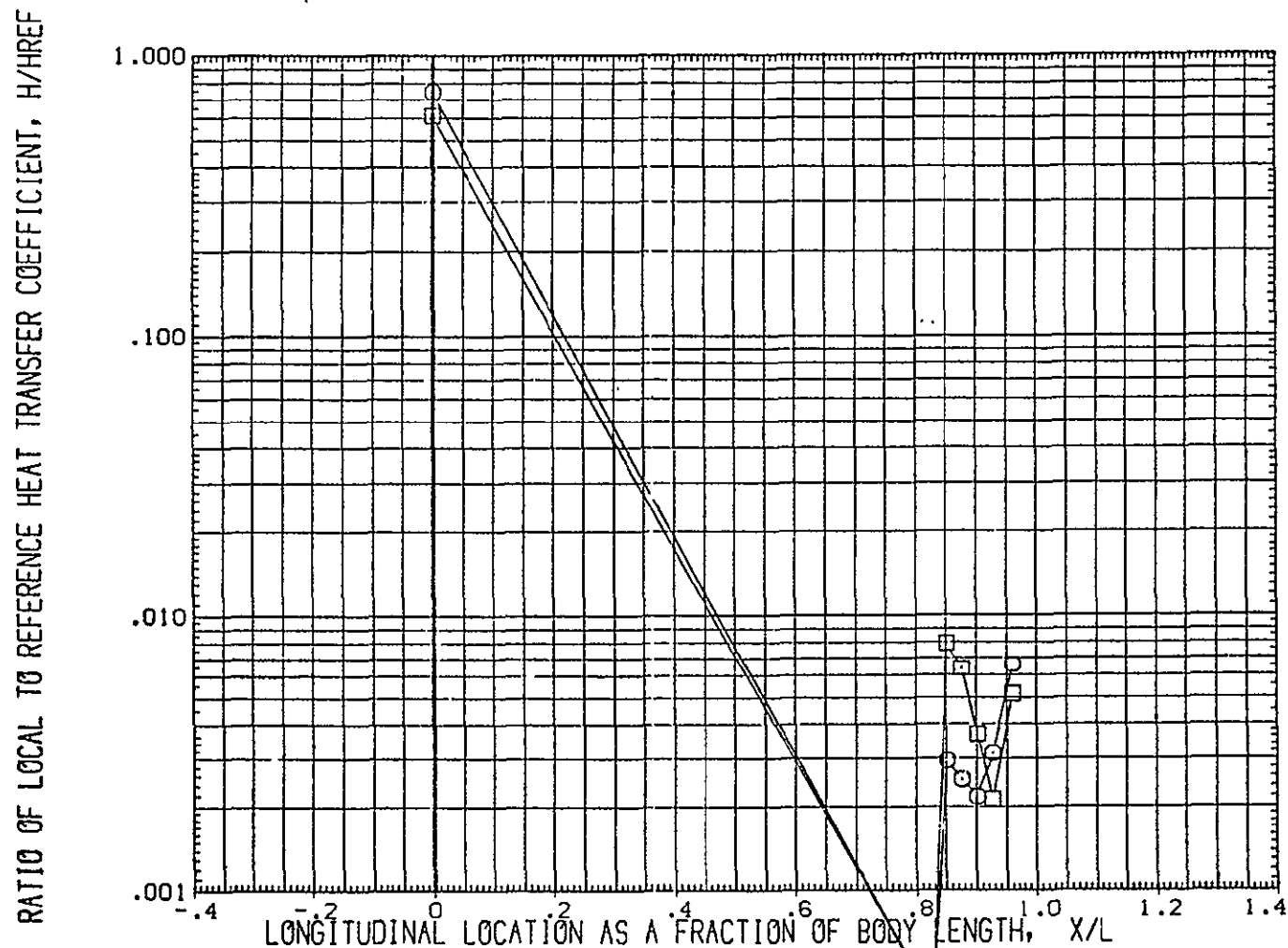


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0
MACH = 18.400 HAW/HT = 1.000 PHI = 241.000 PAGE 173

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	OH12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	OH12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

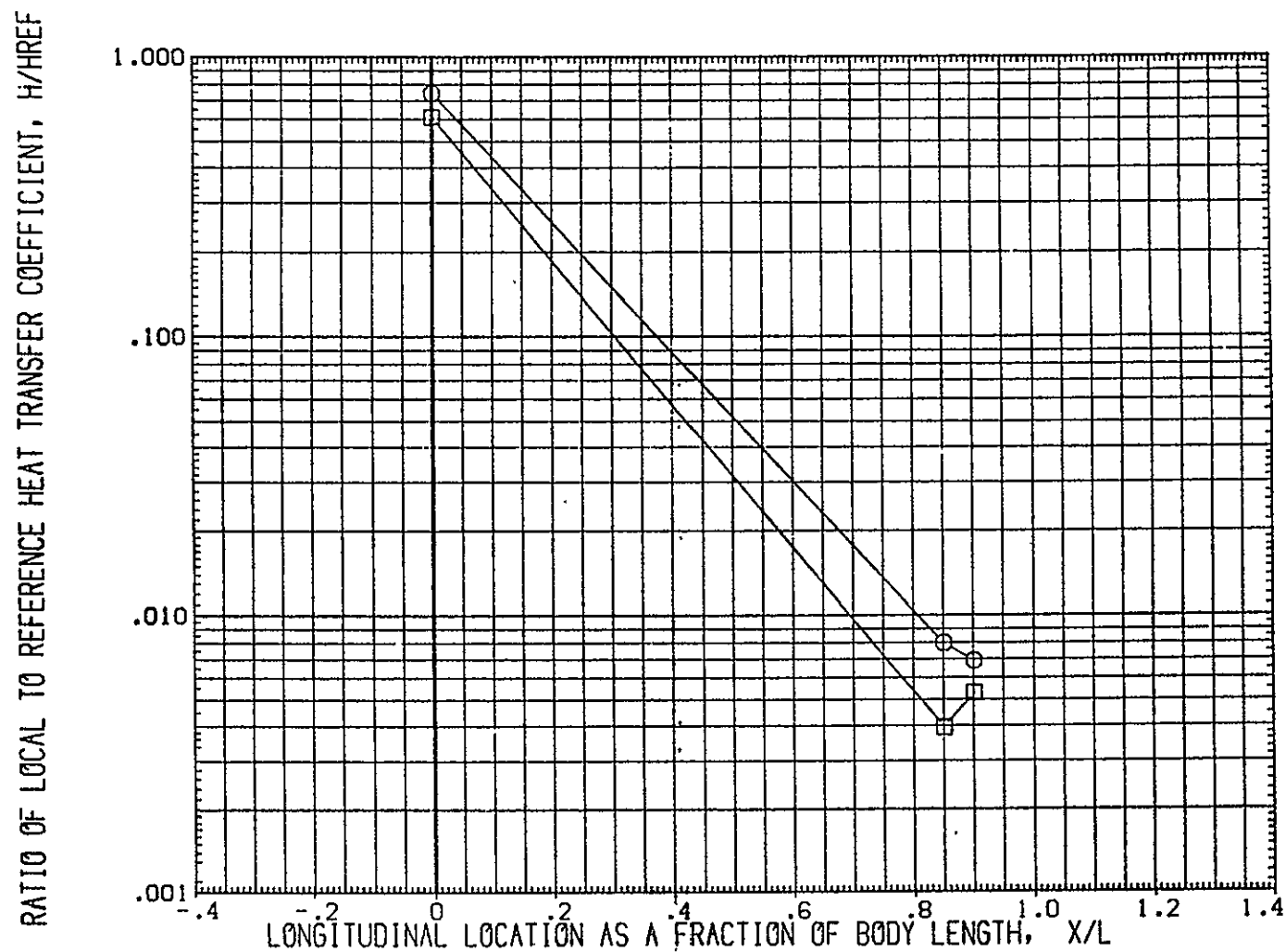


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0
MACH = 18.400 HAW/HT= 1.000 PHI = 247.000 PAGE 174

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	QH12/1H21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	QH12/1H21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

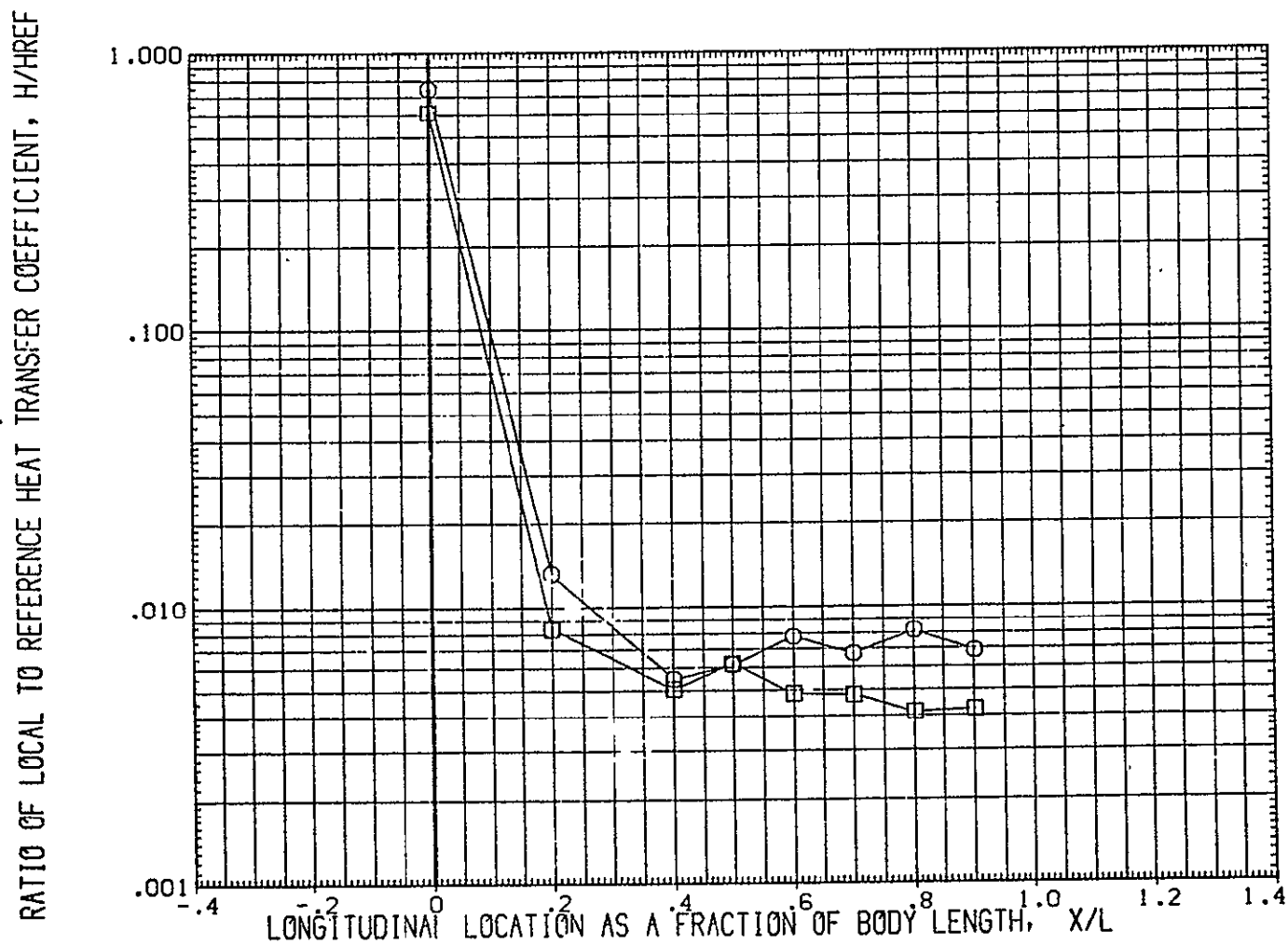


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

MACH = 18.400 HAW/HT= 1.000 PHI = 270.000

DATA SET SYMBOL	CONFIGURATION DESCRIPTION	ALPHA	BETA
(RUGT01)	OH12/IH21 (CAL HST 173-100) 37 T TANK	.000	.000
(RUGT03)	OH12/IH21 (CAL HST 173-100) 37 T-NP TANK	.000	.000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

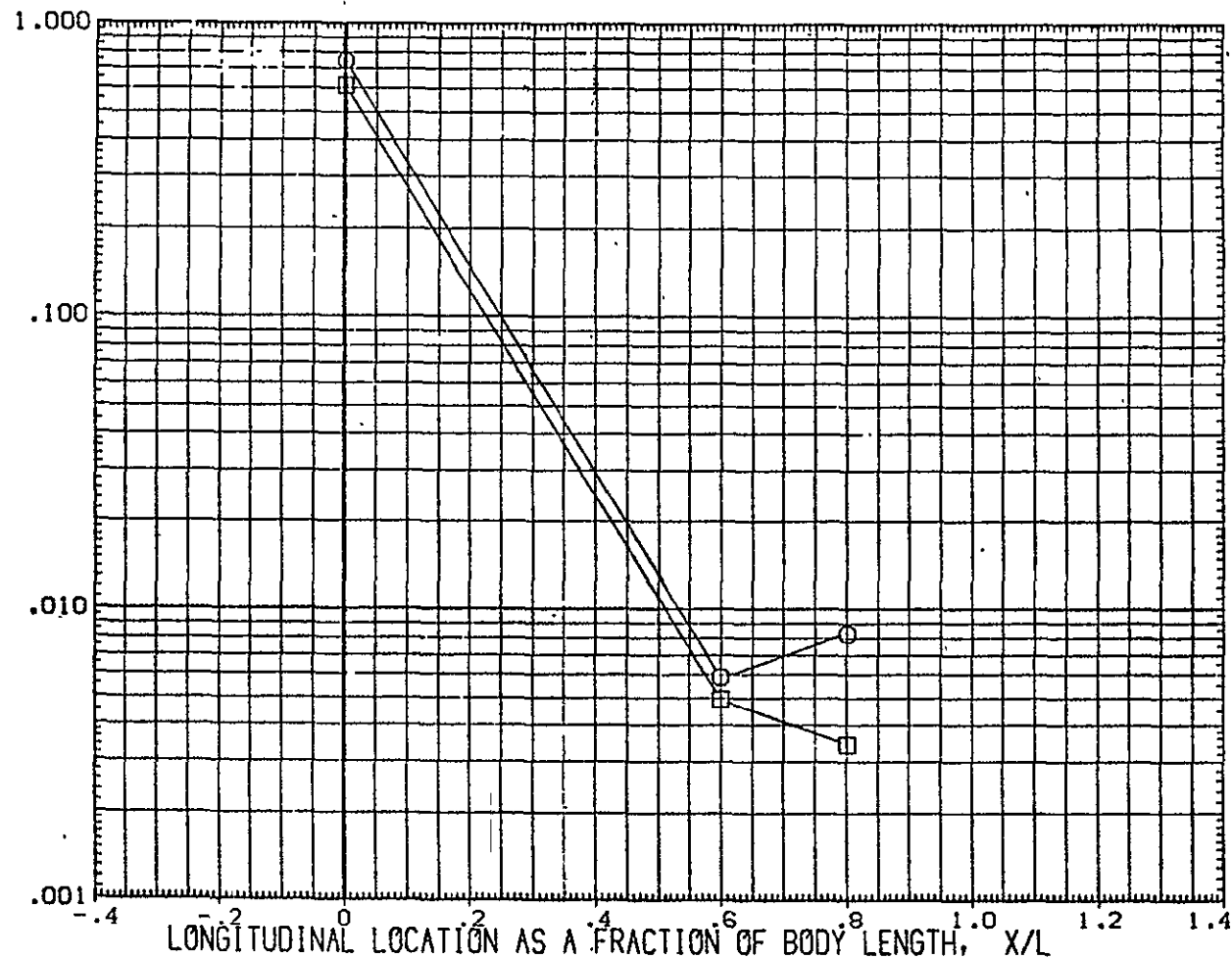


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER $\alpha = 0$
MACH = 18.400 $H_{AW}/H_T = 1.000$ $\phi = 315.000$ PAGE 176

OH12 + IH21 MODEL 37 T(01)/T-NP(03) TANK (IUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
O	.900	.000	18.400	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

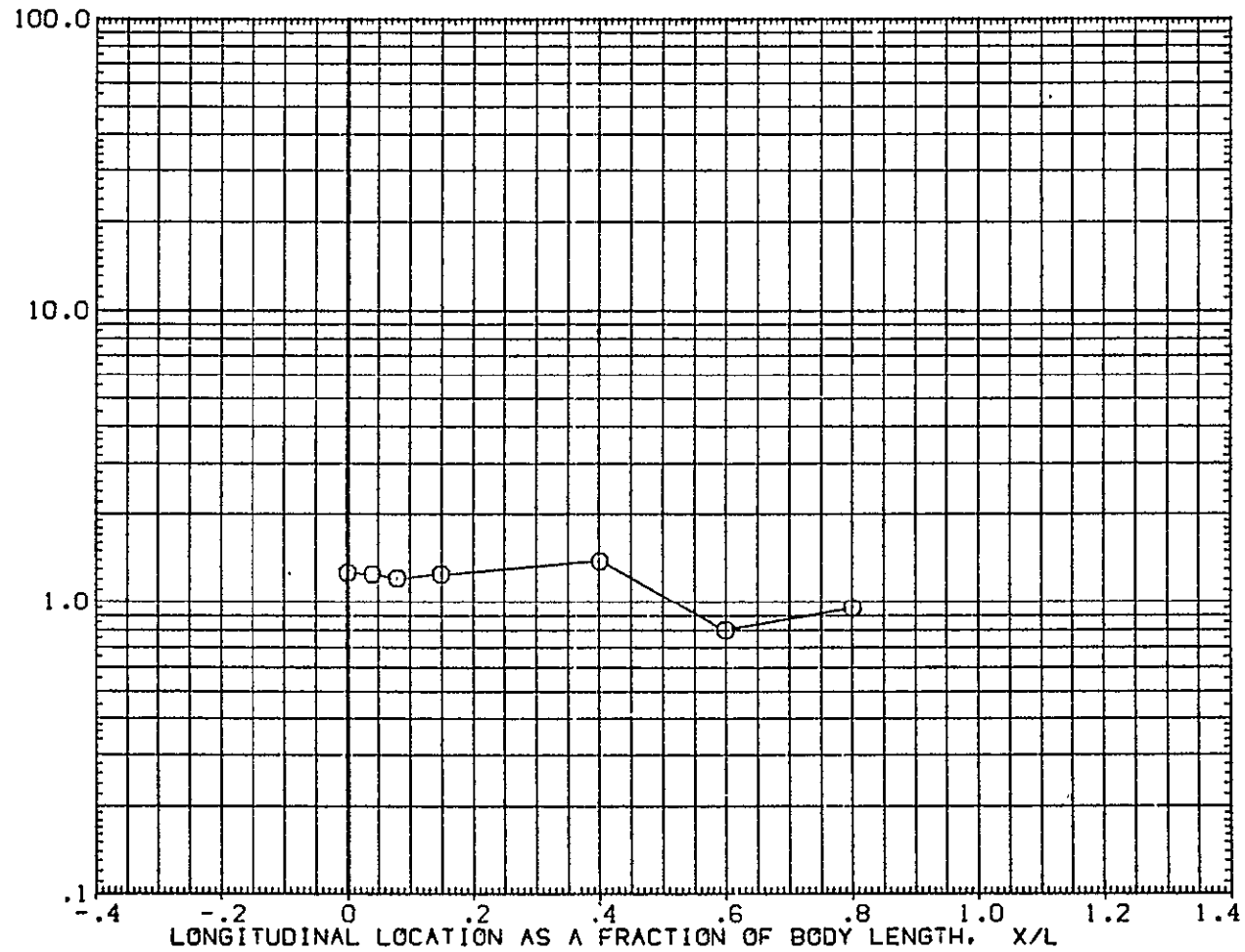


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 T(01)/T-NP(03) TANK (IUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.900	180.000	18.400	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

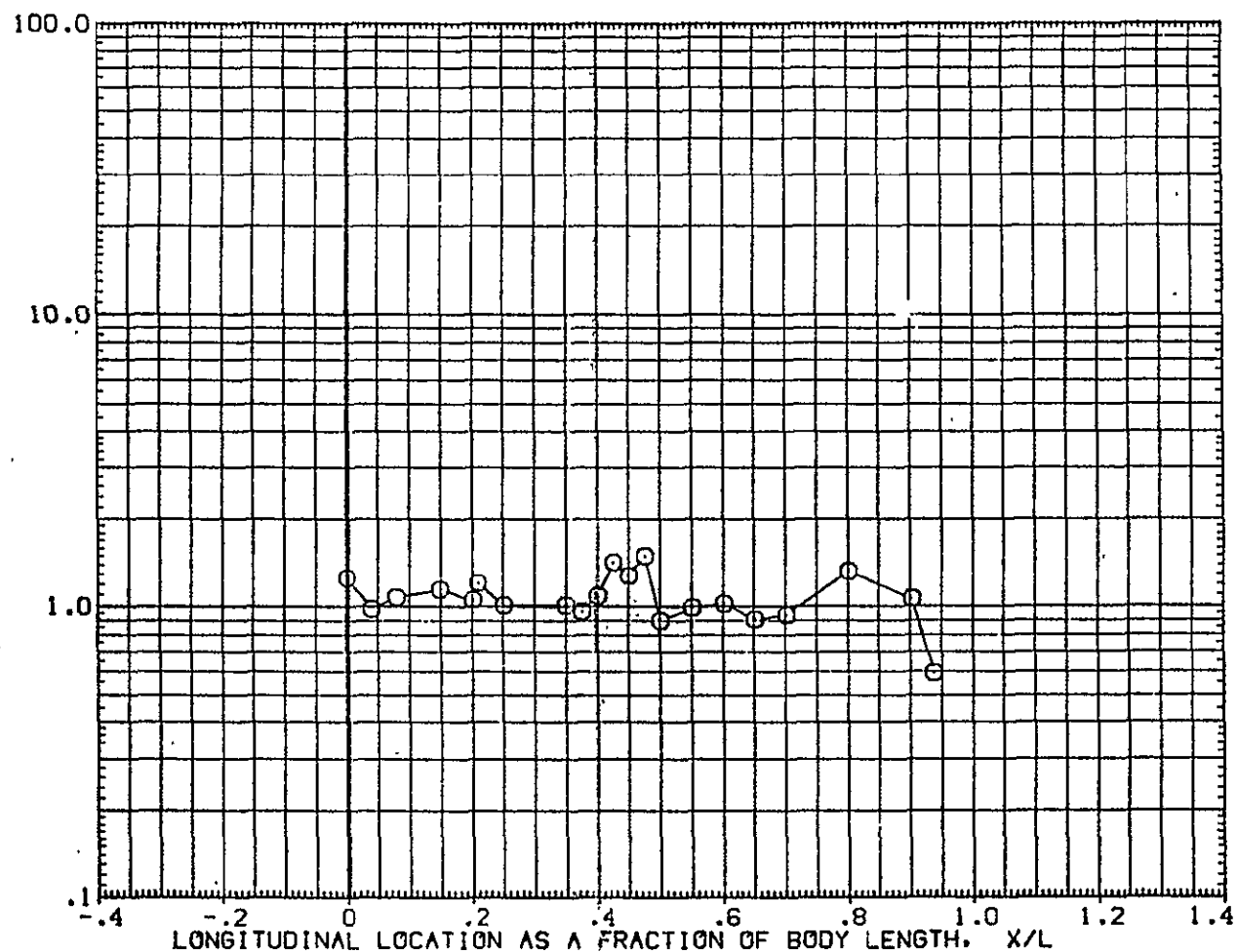


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

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RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, h_i/h_u

CH12 + IH21 MODEL 37 T(01)/T-NP(03) TANK (IUGT01)

SYMBOL	MAW/HT	PHI	PACH	ALPHA	PARAMETRIC VALUES	
O	.900	199.000	18,400		.000	BETA .000

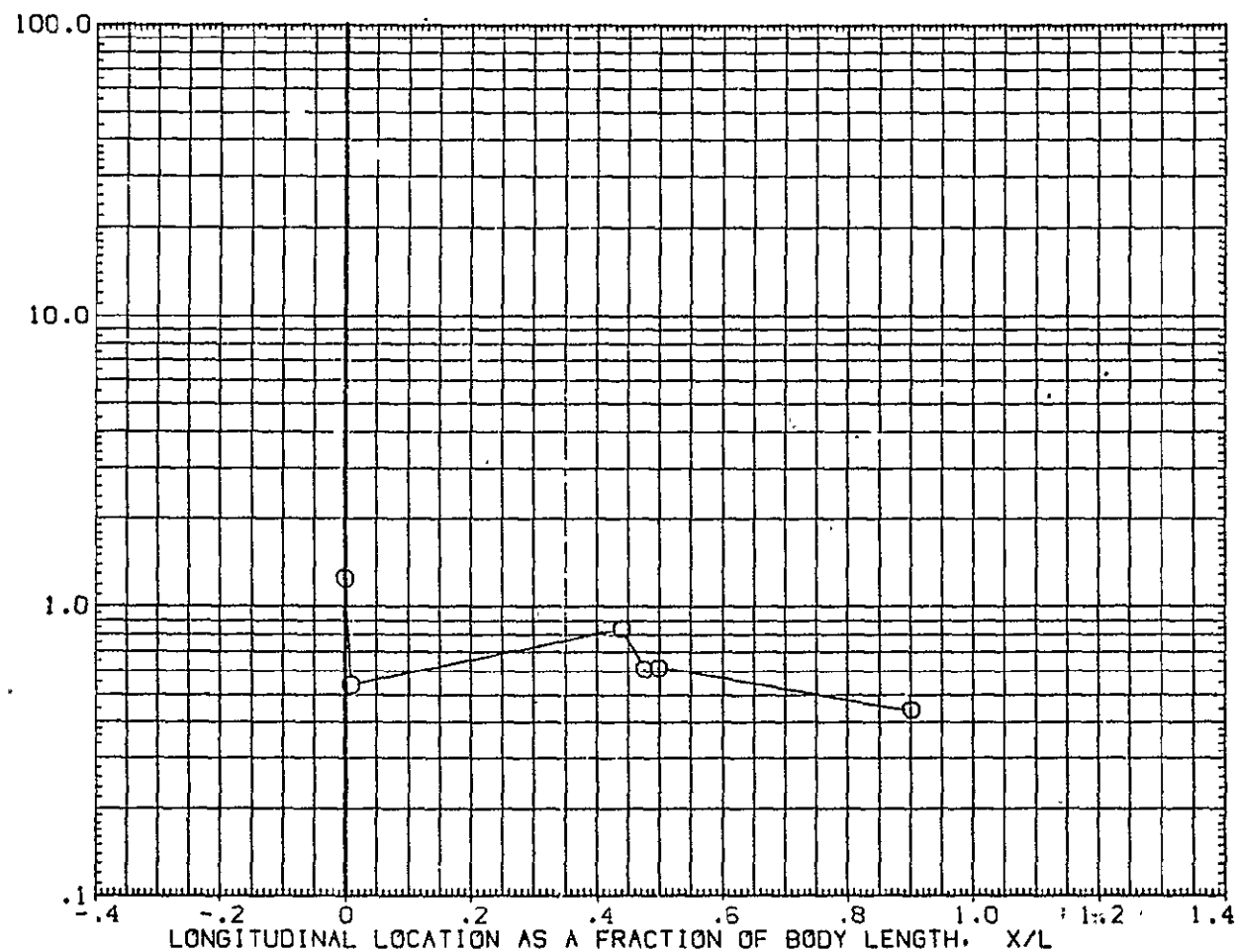


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 T(01)/T-NP(03) TANK (IUGT01)

SYMBOL
O
HAW/HT .900
PHI 221.000
MACH 18.400

PARAMETRIC VALUES
ALPHA .000
BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

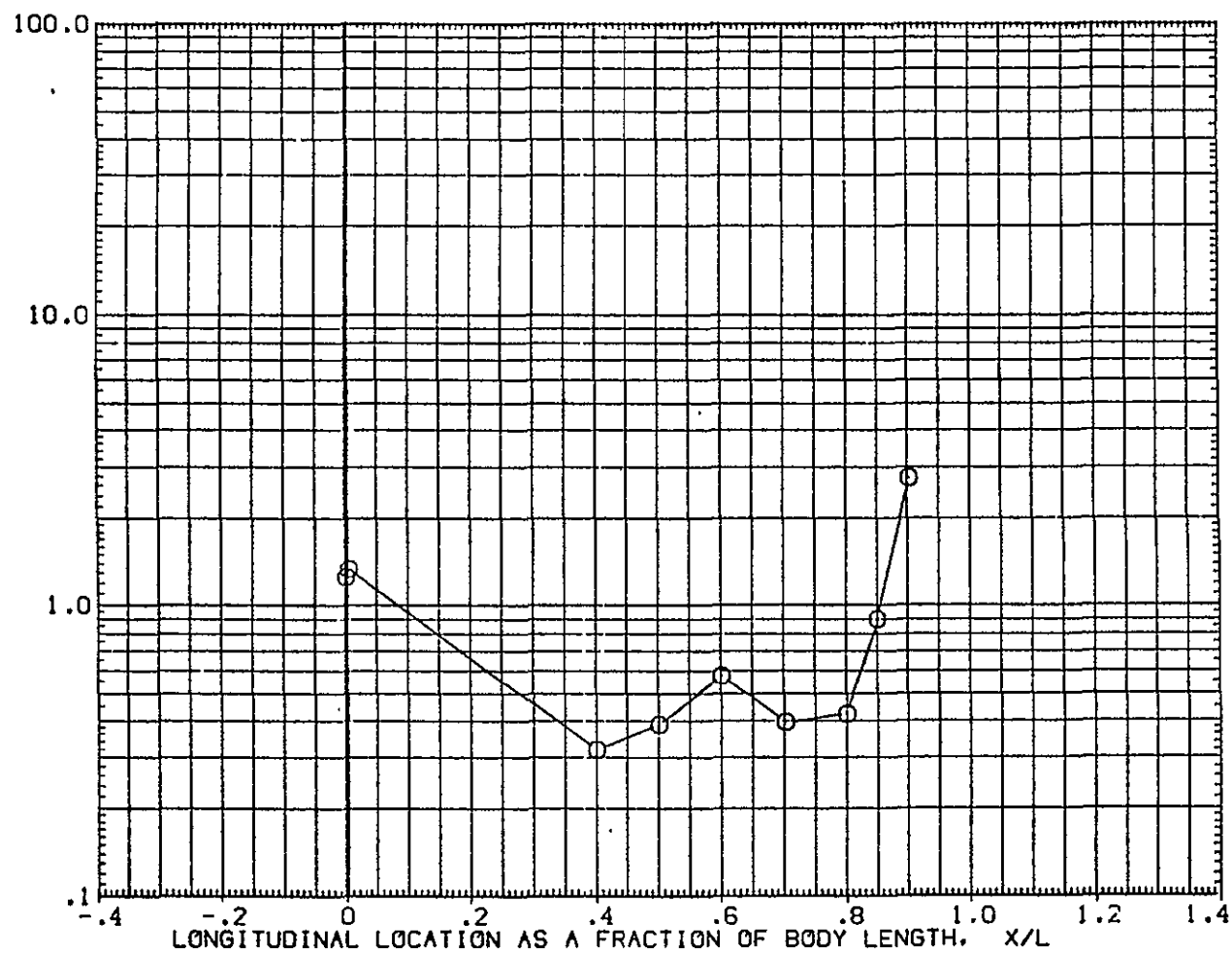


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 T(01)/T-NP(03) TANK (1UGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
O	.900	241.000	18.400	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

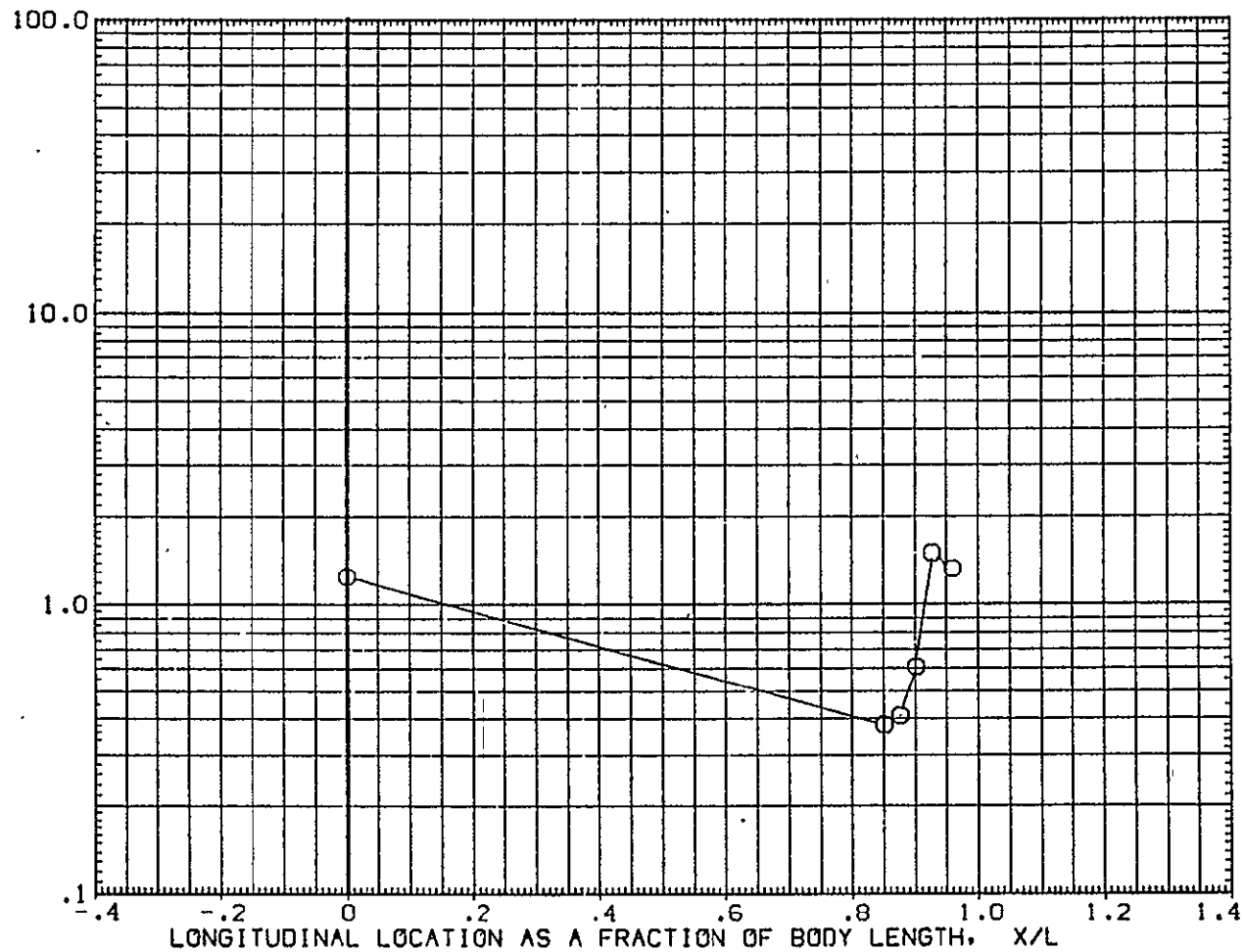


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 T(01)/T-NP(03) TANK (IUGT01)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.900	247.000	18.400	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

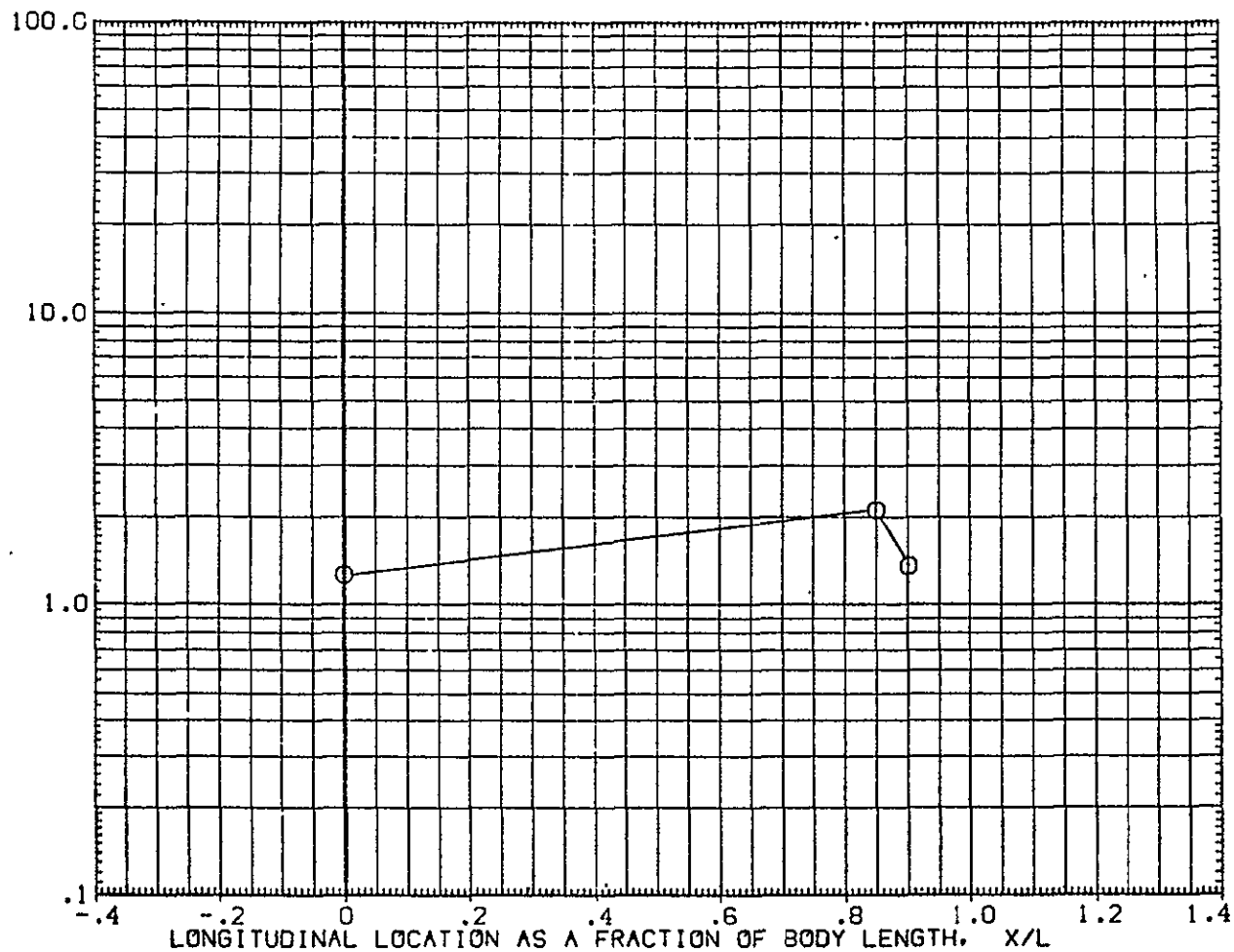


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

CH12 + IH21 MODEL 37 T(01)/T-WP(03) TANK (IUGT01)

SYMBOL	HAW/HI	PHI	MACH	PARAMETRIC VALUES			
O	.900	270.000	18.400	ALPHA	.000	BETA	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

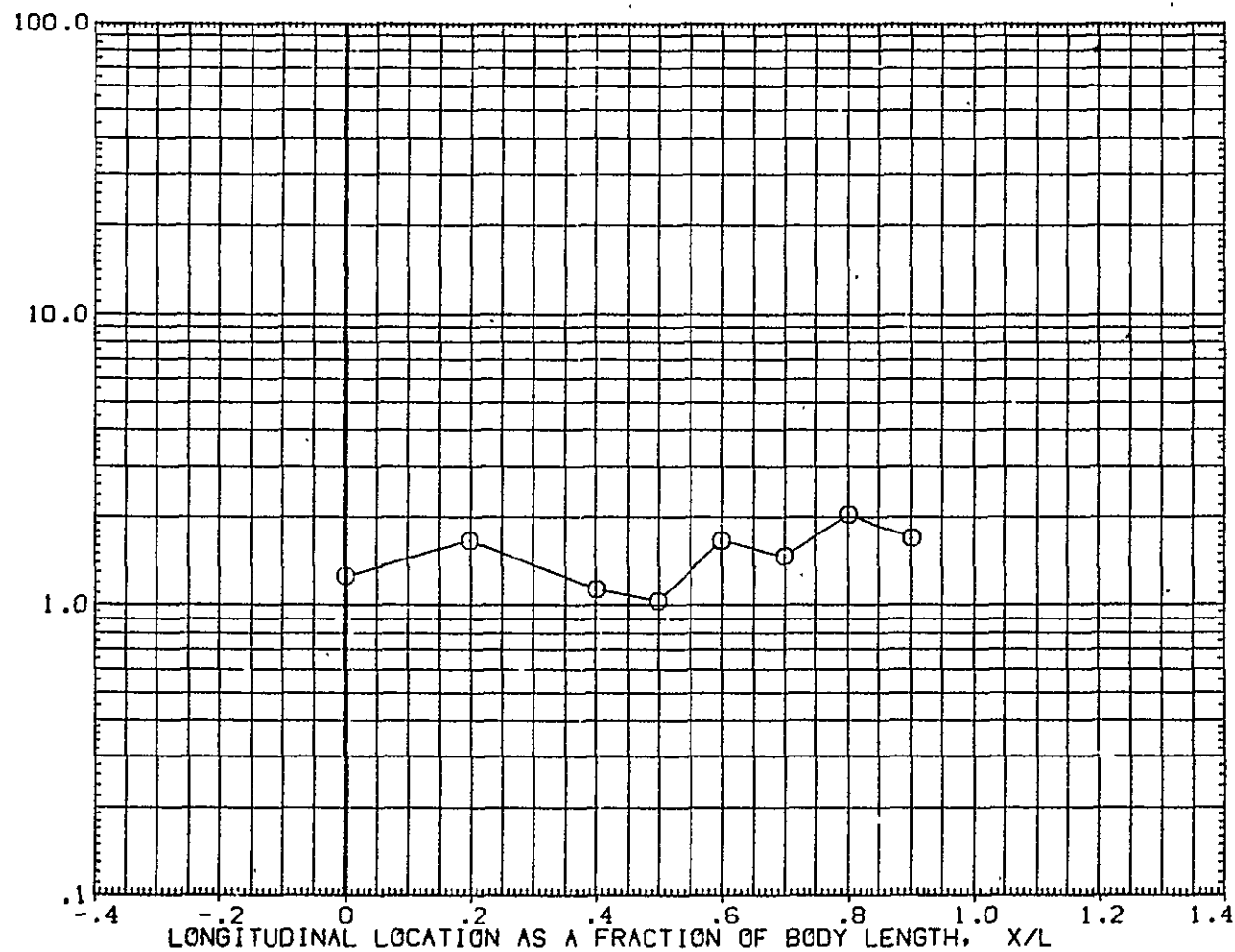


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 T(01)/T-NP(03) TANK (IUGT01)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.900	315.000	18.400	.000	BETA	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

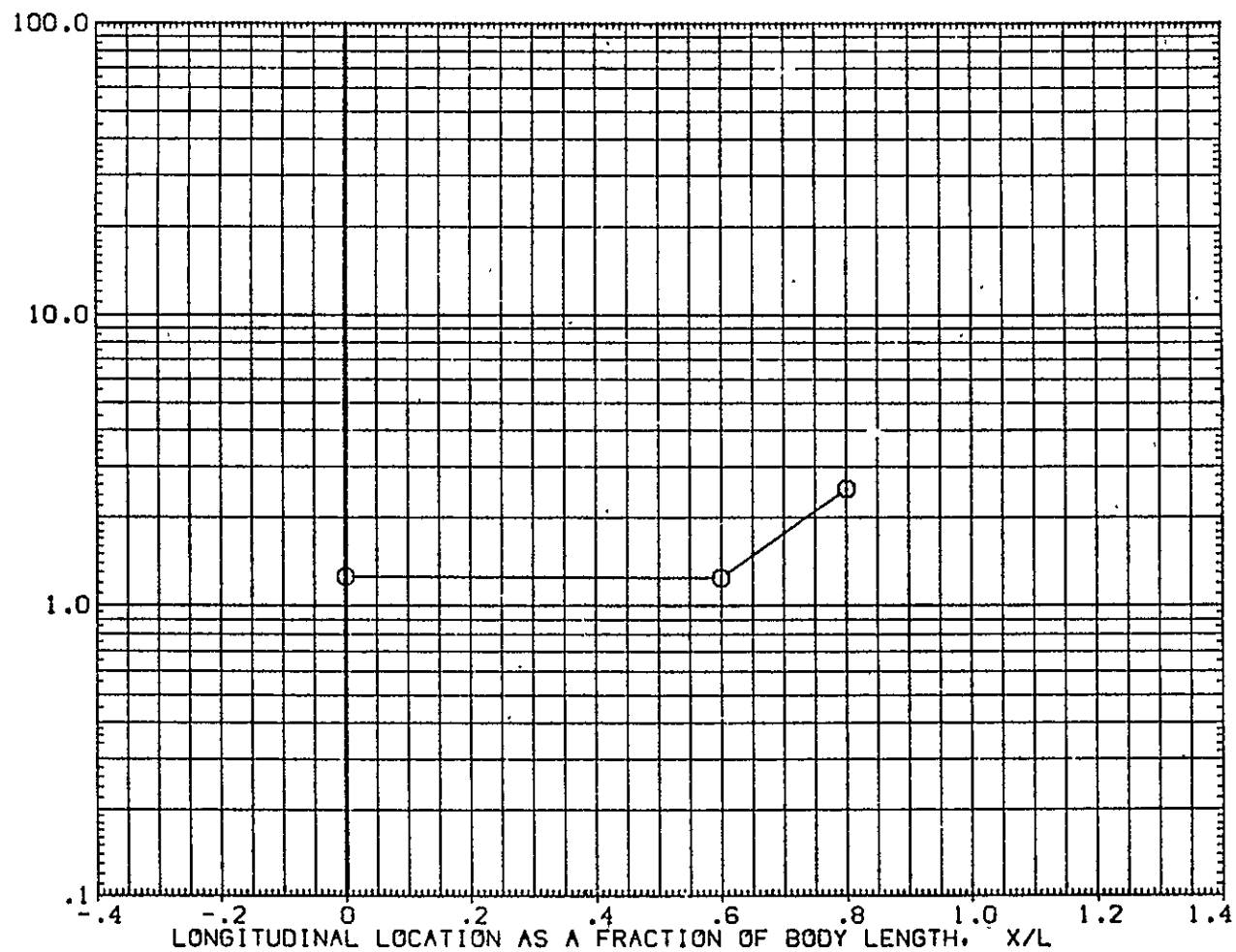


FIG. 7 EFFECT OF PROTUBERANCES ON THE EXTERNAL TANK HEAT TRANSFER ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	.000	6.997	ALPHA	.000	BETA
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

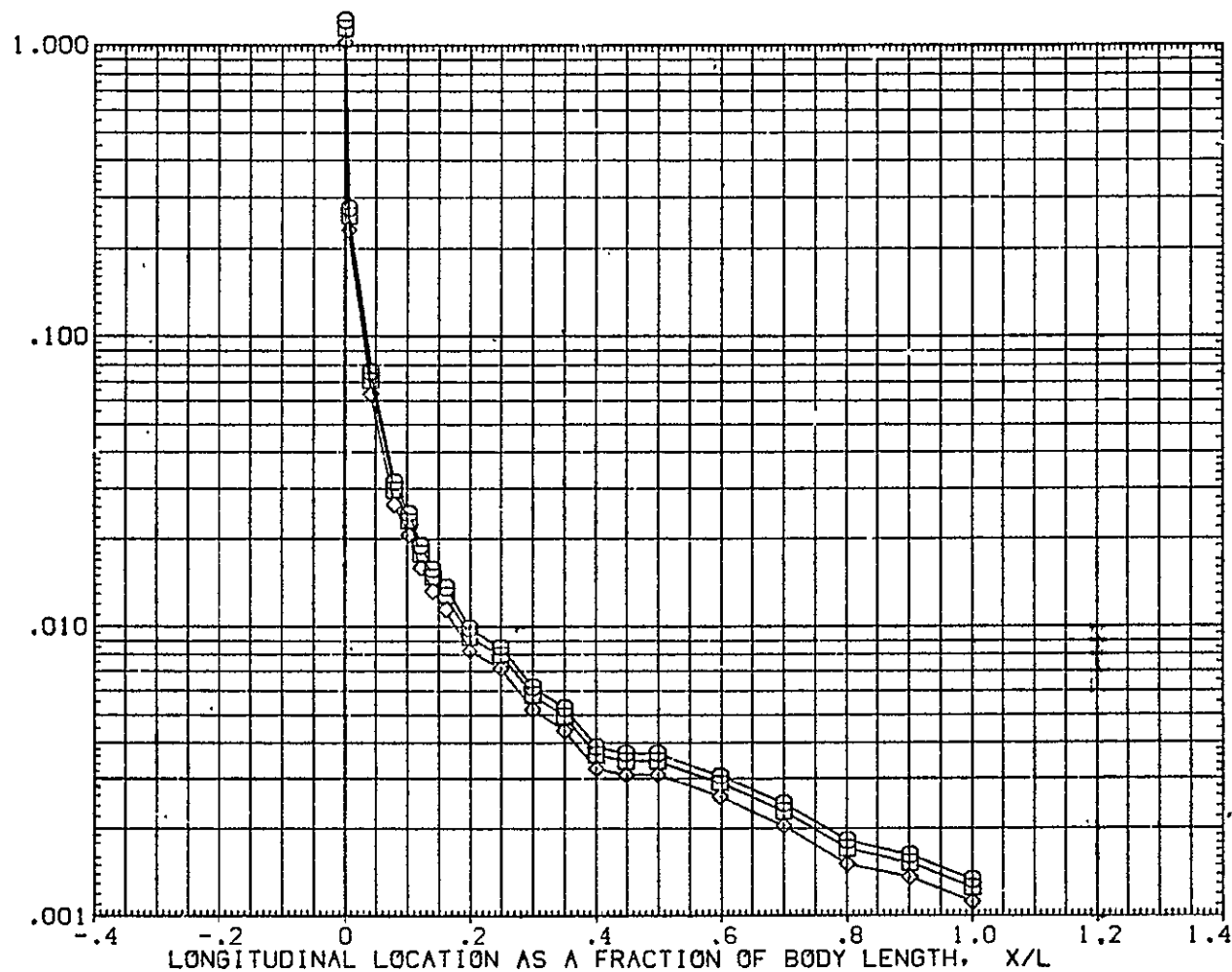
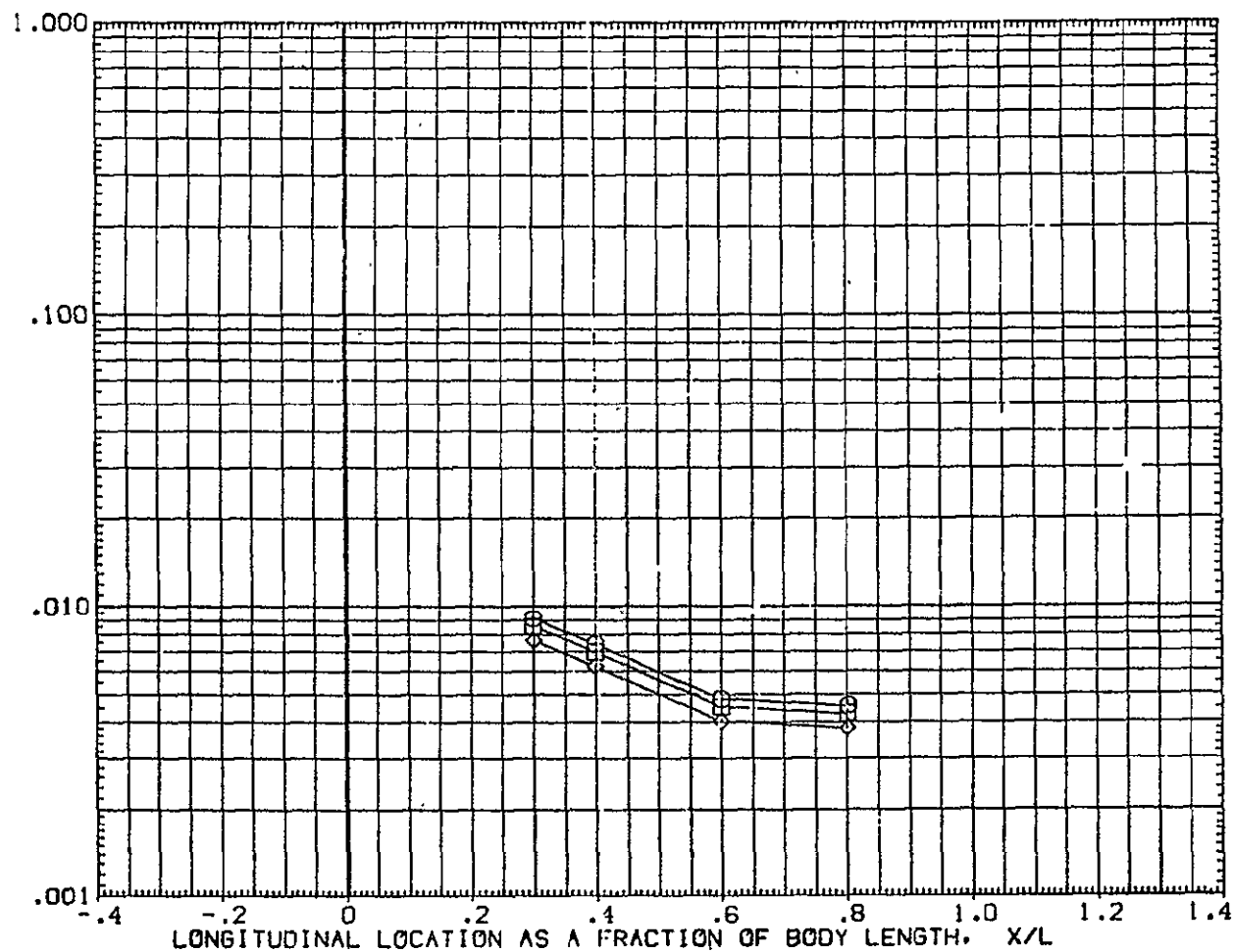


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	25.000	6.937	.000		.000
◇	.900					
	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAY/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	30.000	6.997	.000	.000	.000
□	.900					
□	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

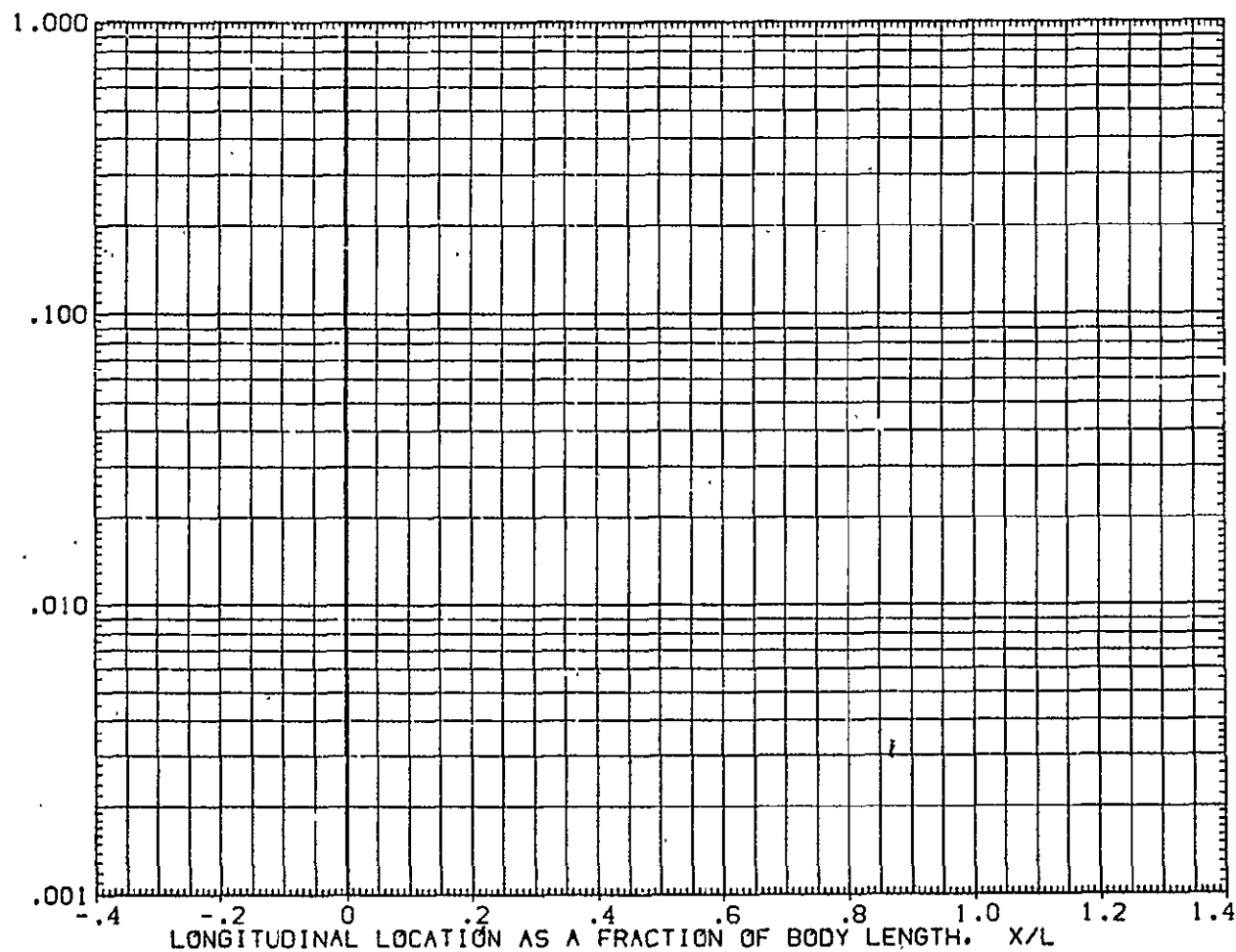
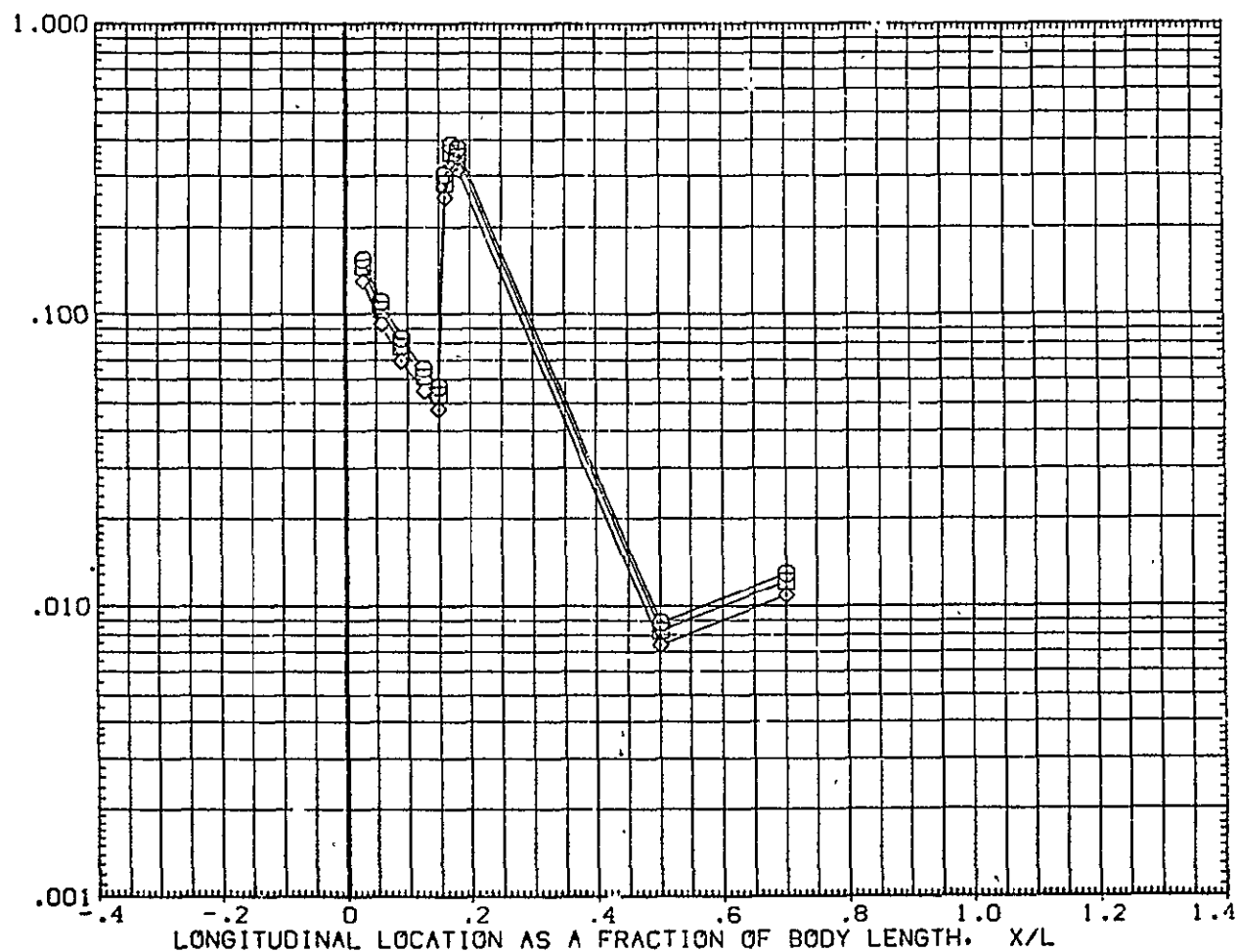


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	180.000	6.997	.000		.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF} FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
◇	.850	.000	7.614	ALPHA	.000	BETA
□	.900					
◇	1.000					

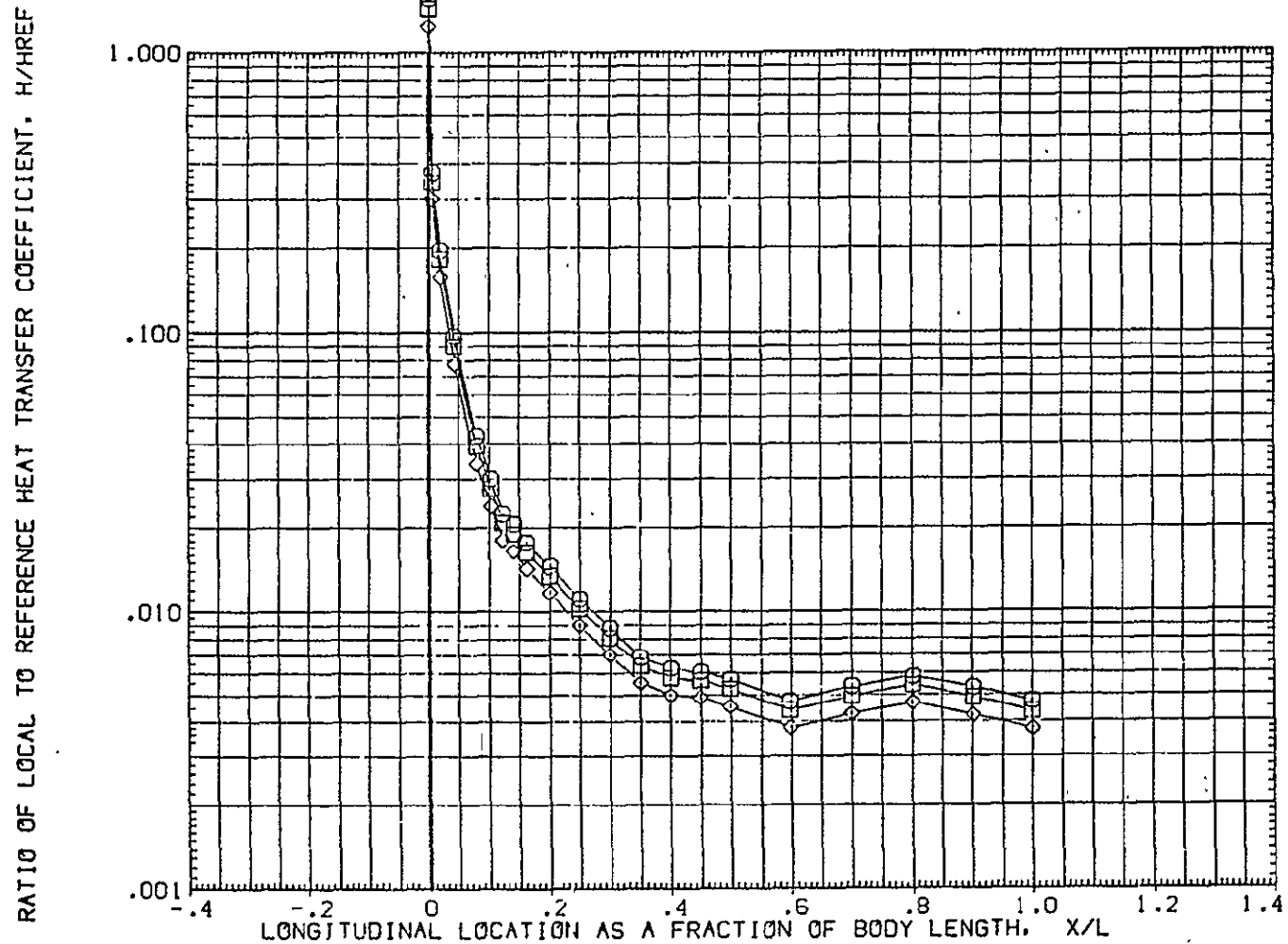


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL

HAW/HT

PHI

MACH

PARAMETRIC VALUES

ALPHA

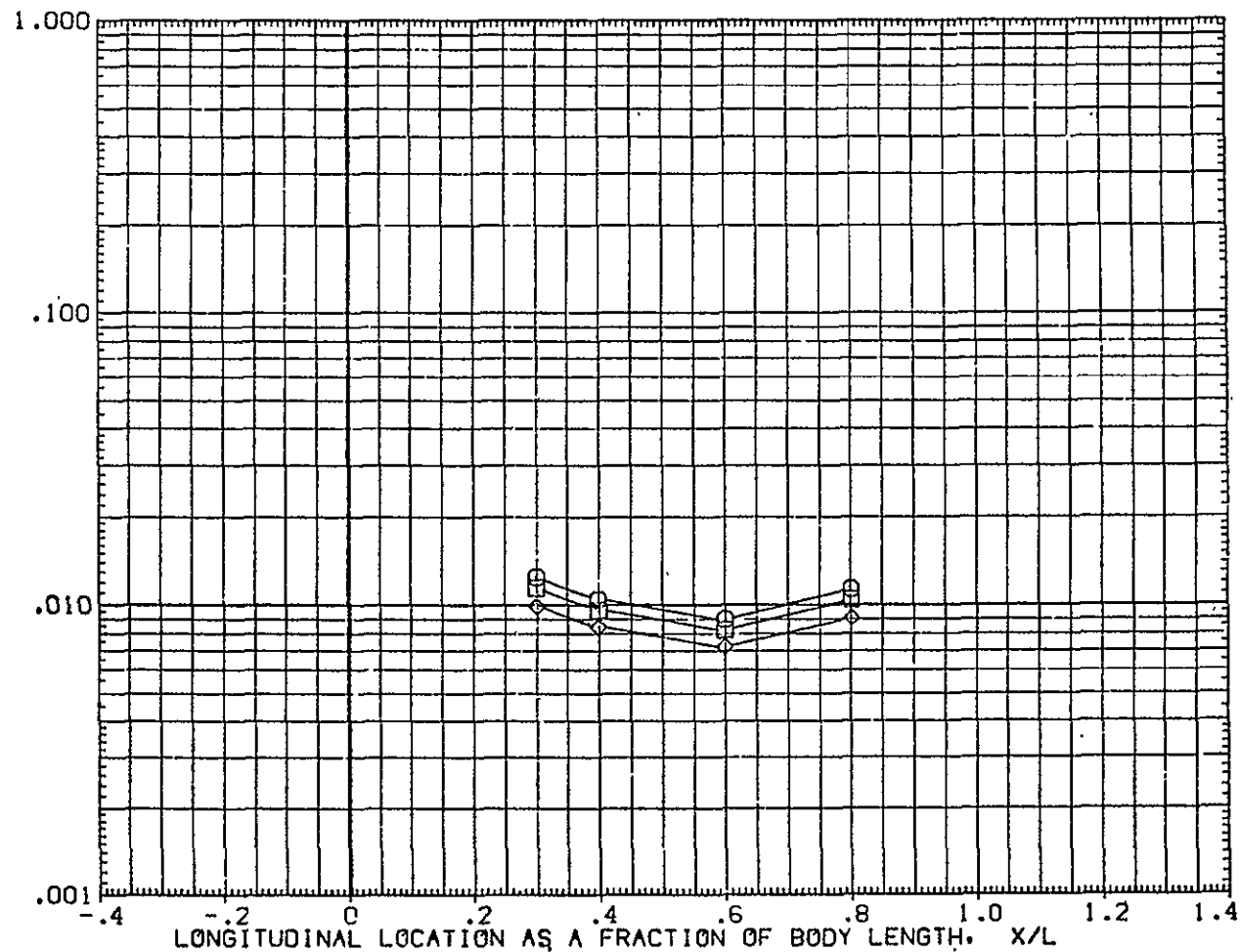
.000

BETA

.000

○
□
◇

.850
.900
1.000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL PST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
◇	.850	30.000	7.614	.000	BETA	.000
□	.900					
◇	1.000					

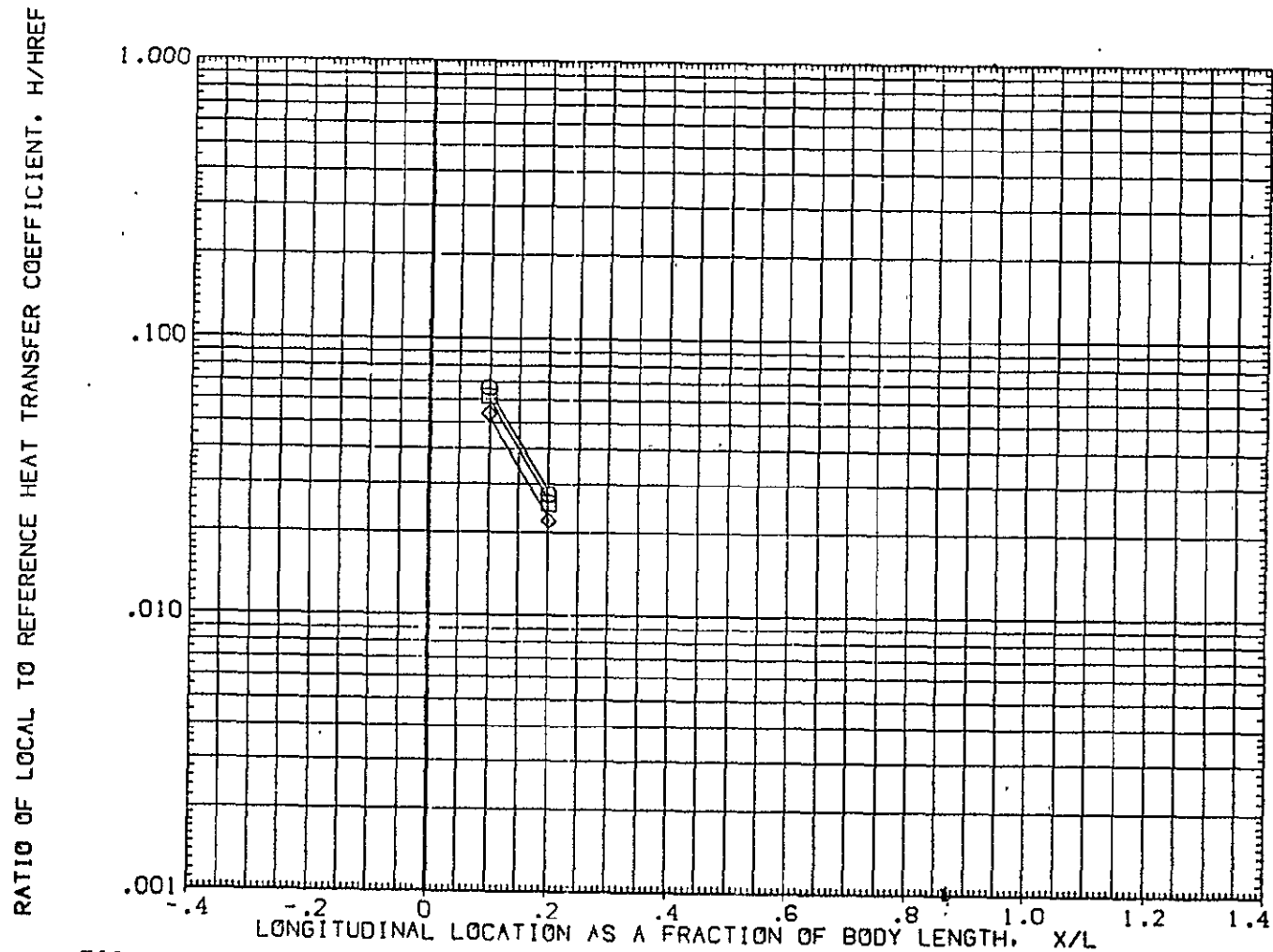
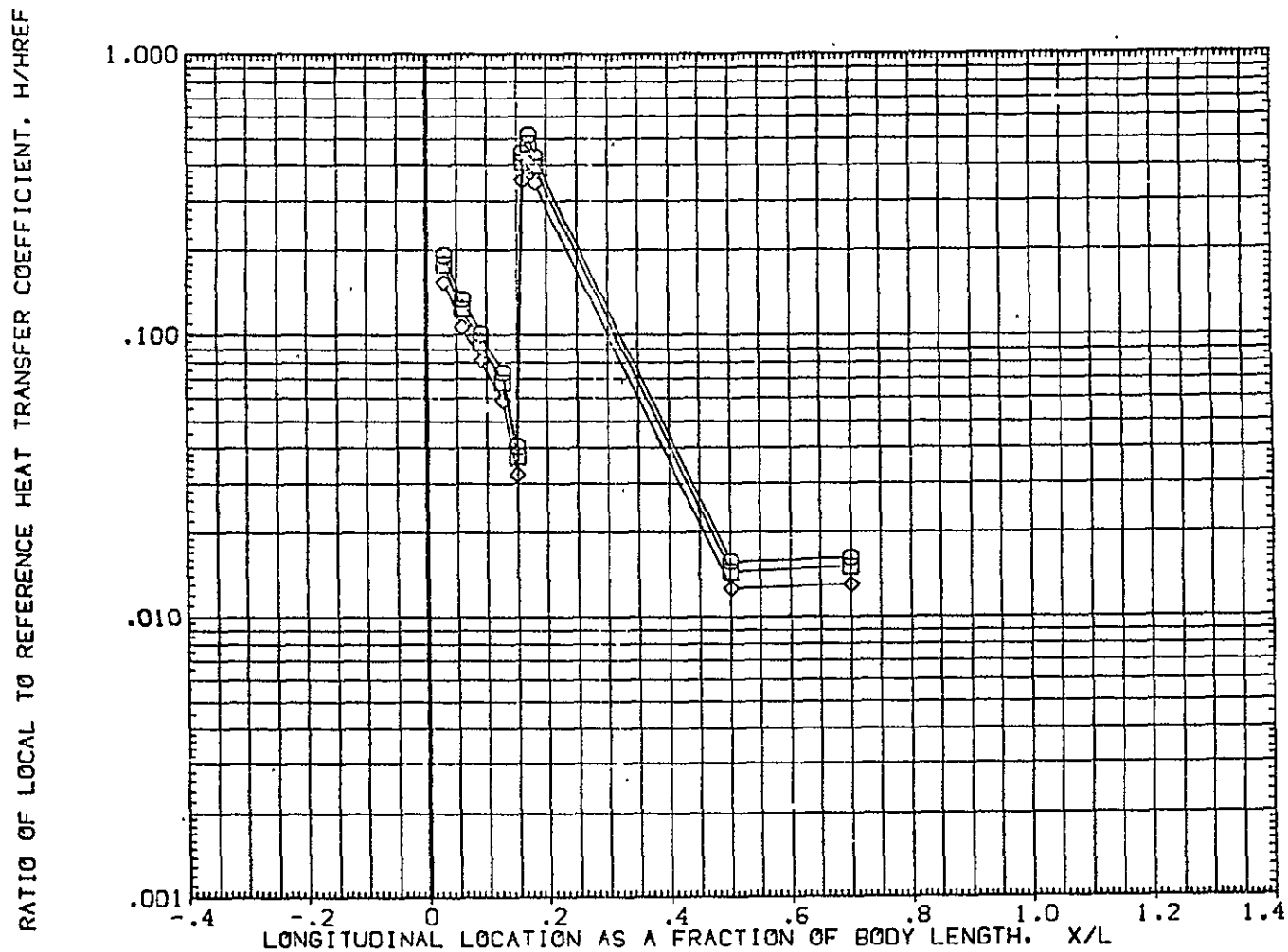


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
◇	.850	180.000	7.614	ALPHA	.000	BETA
□	.900					
○	1.000					

FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

0412/1H21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	.000	16.060	.000	.000	.000
□	.900					
◇	1.000					

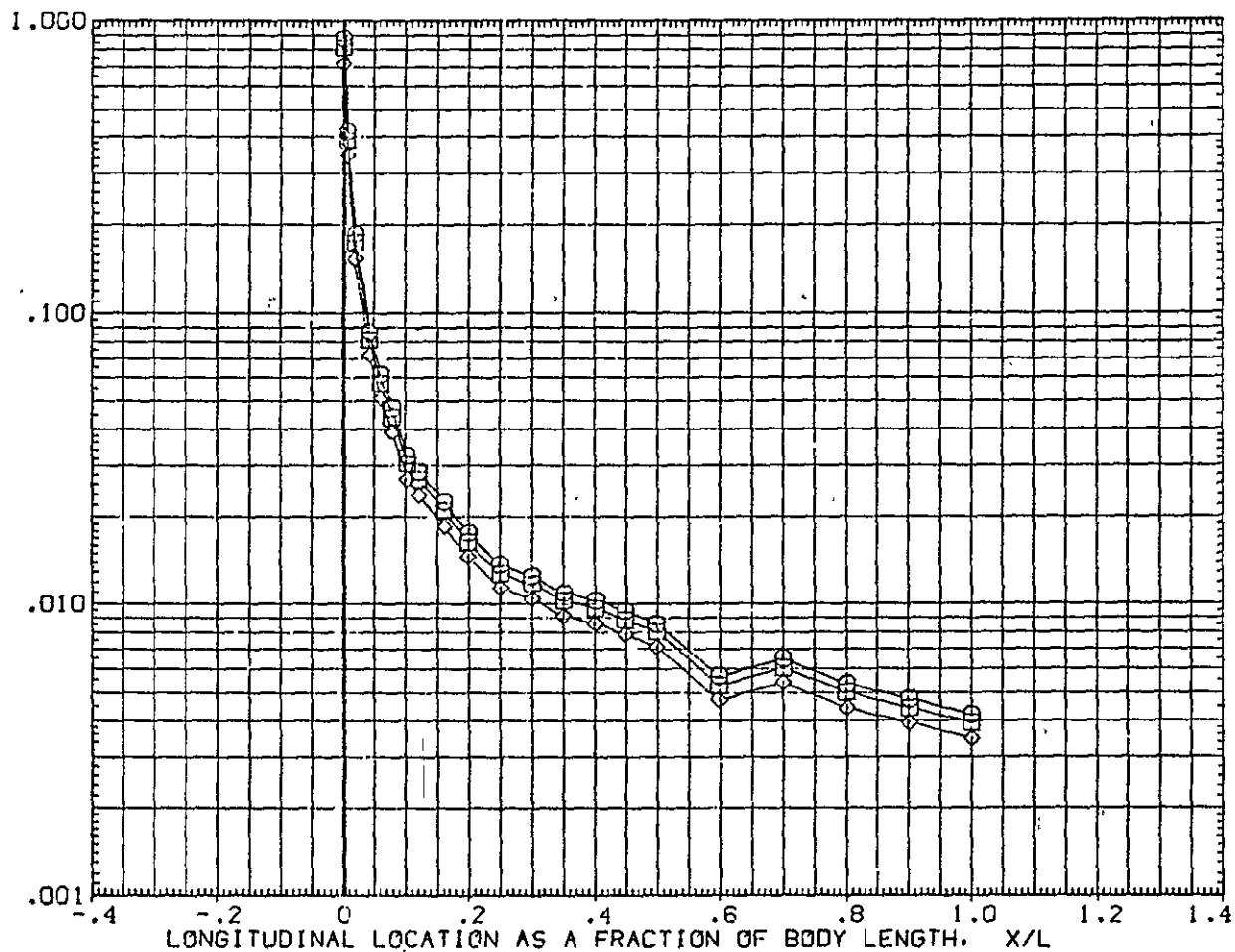
RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} 

FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

OH12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES		
○	.850	25.000	16.060		.000	BETA	.000
□	.900						
◇	1.000						

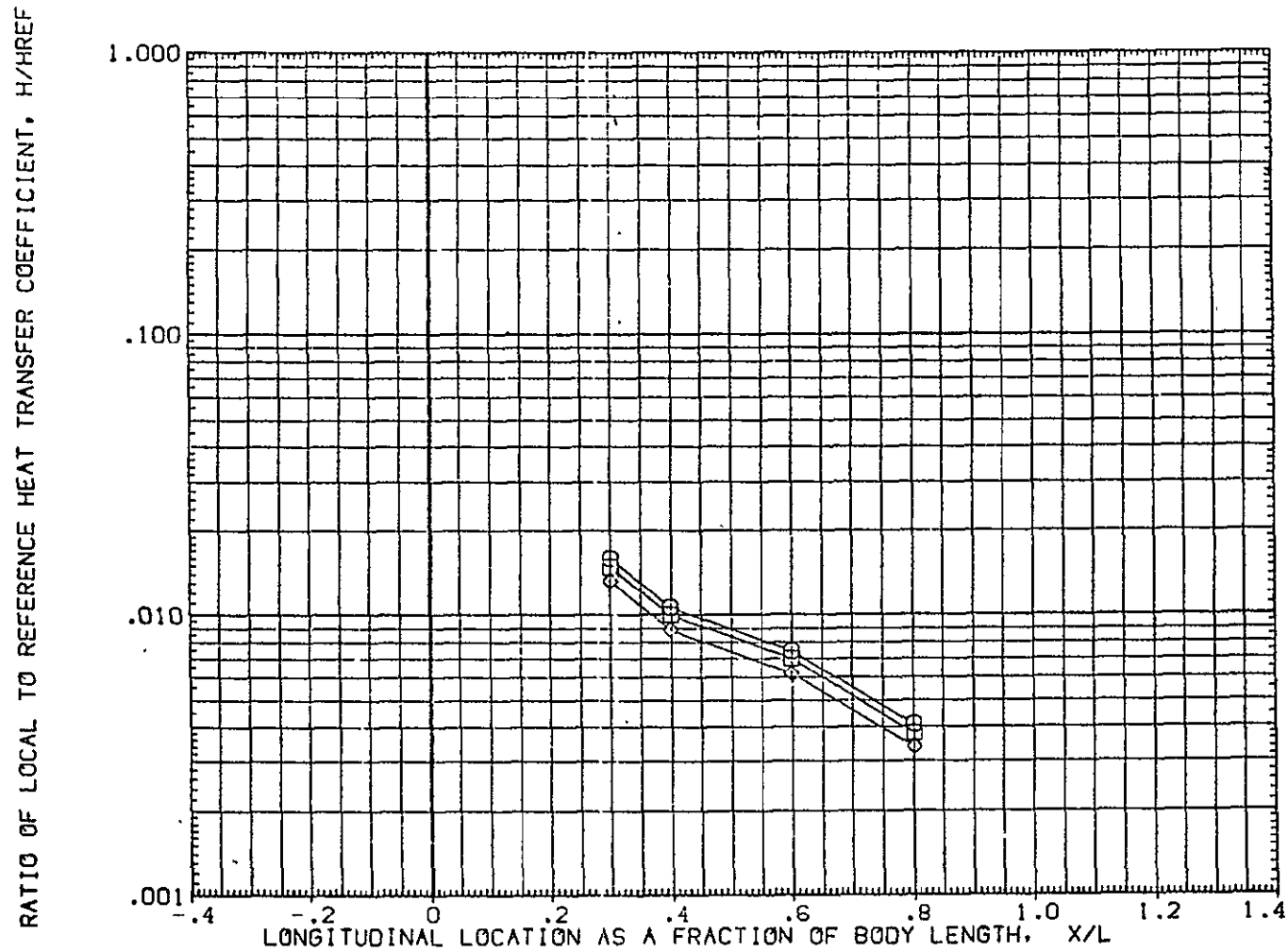


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAM/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	30.000	16.060	.000	.000	.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

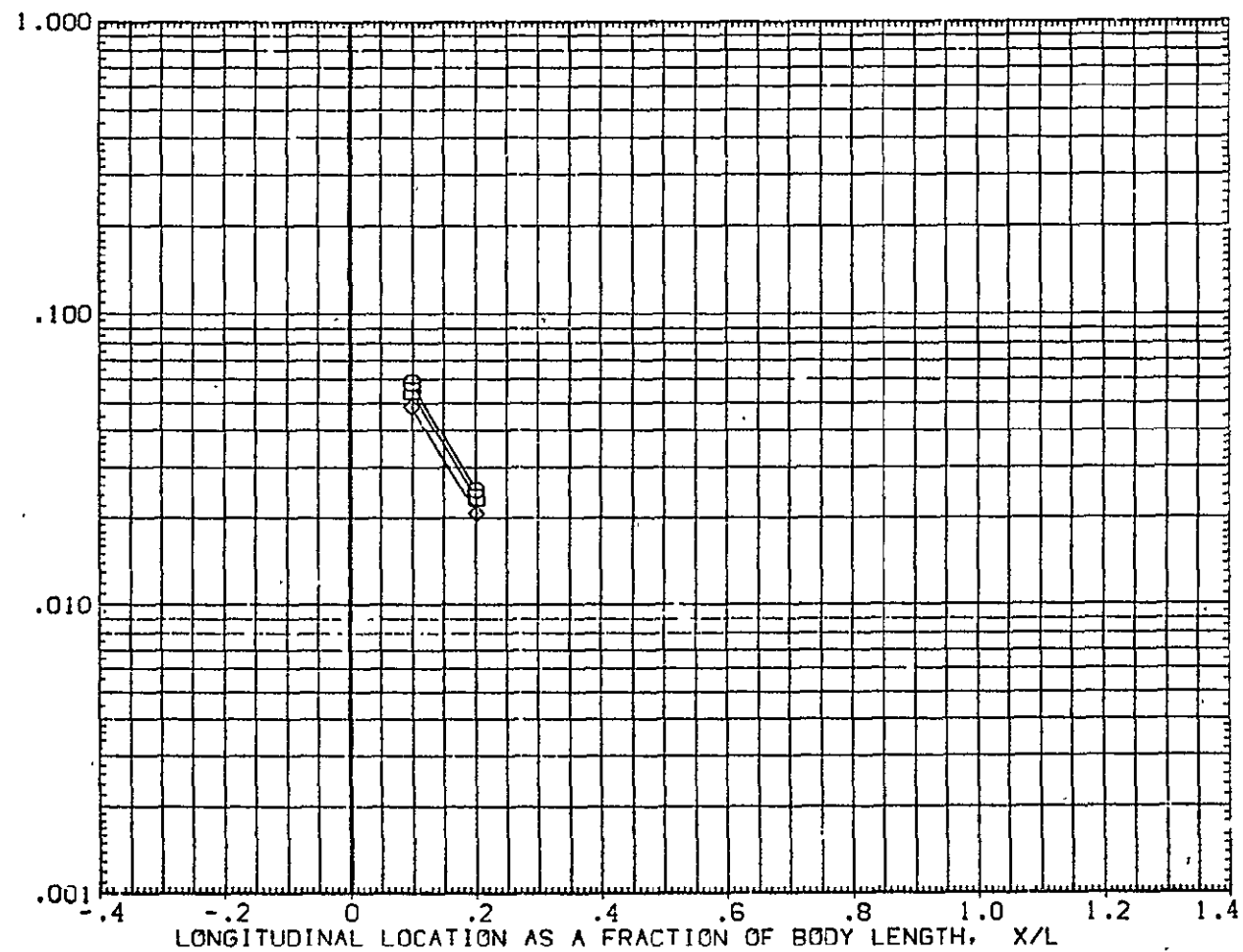
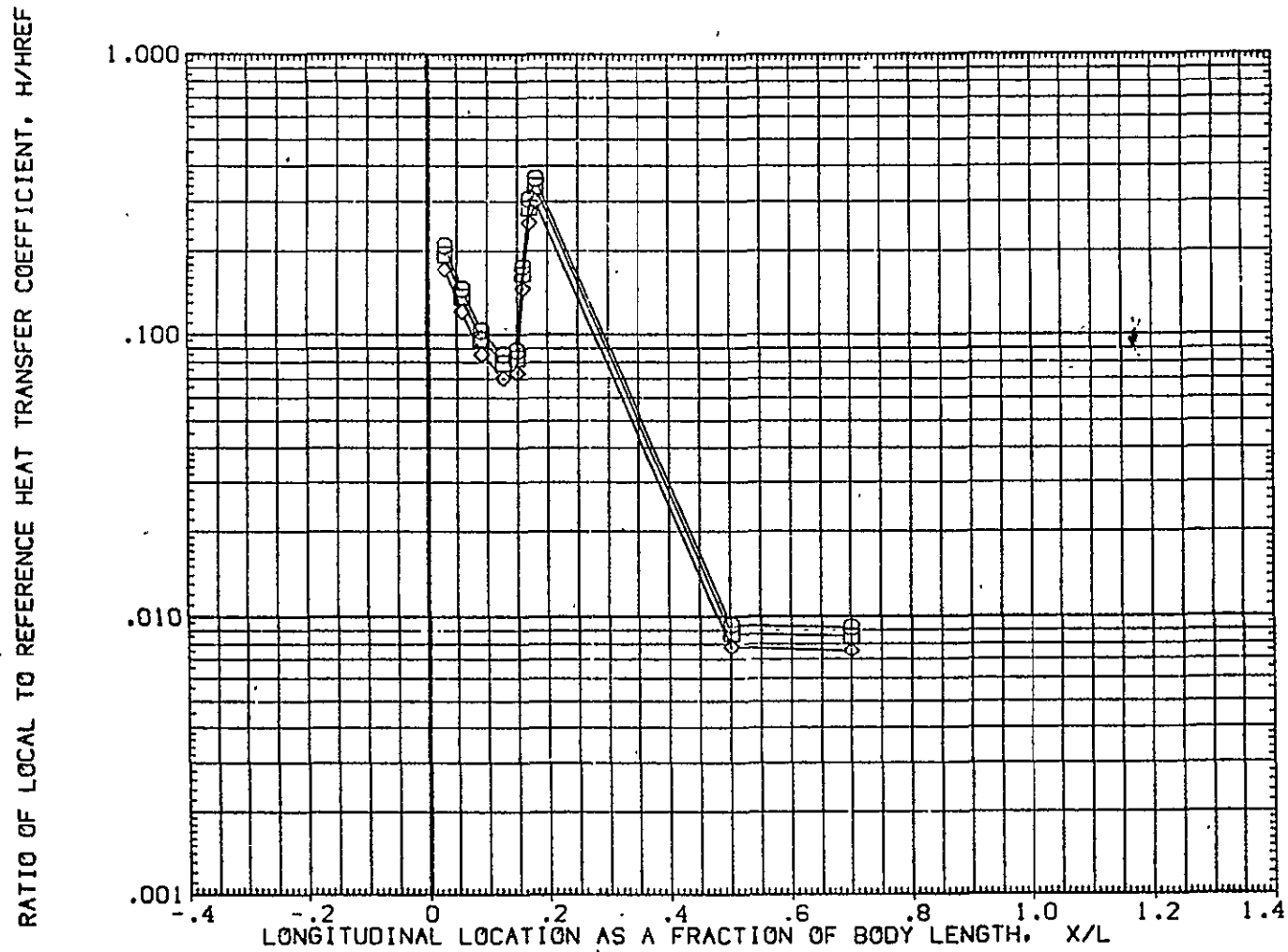


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

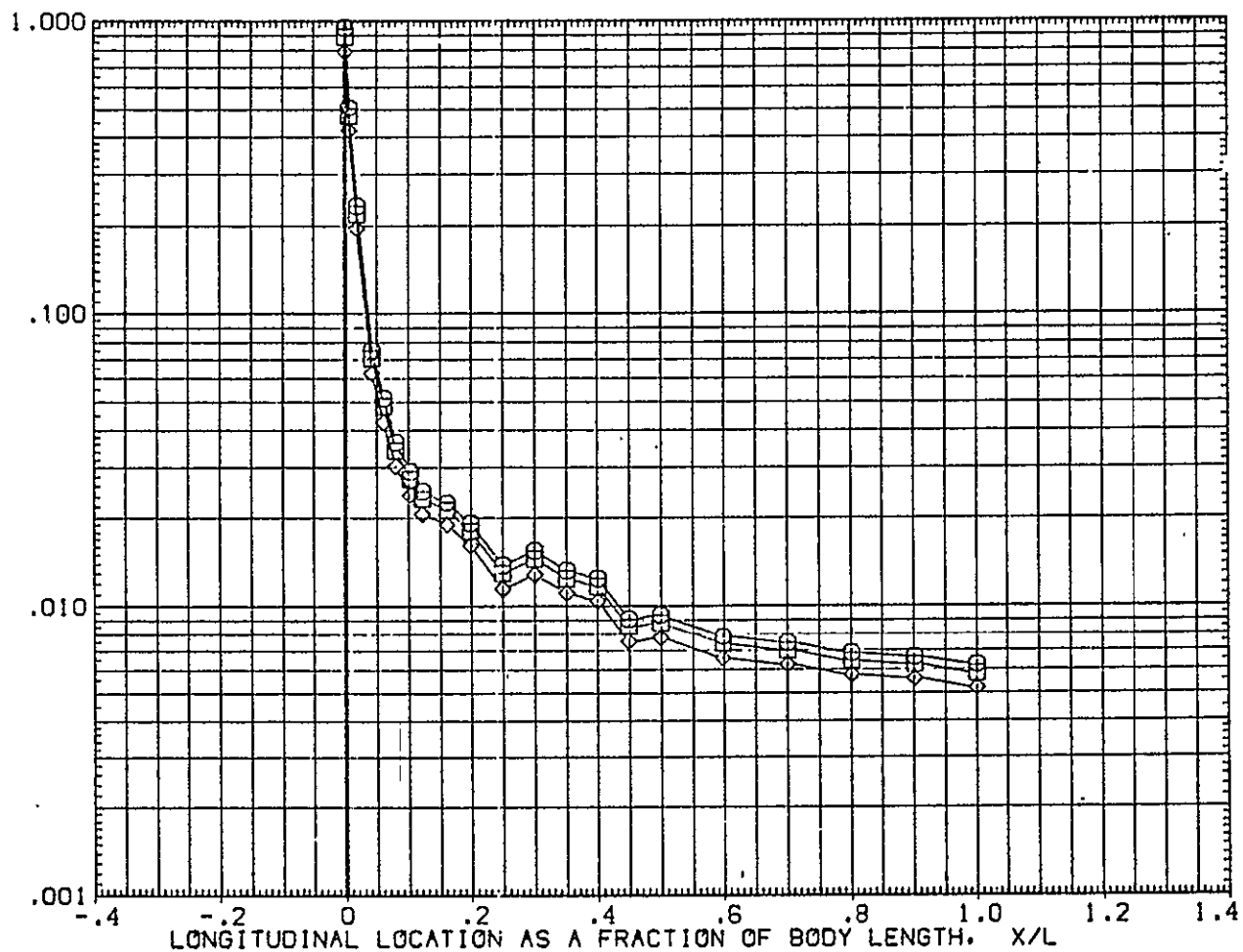
SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
◇	.850	180.000	16.060	.000	BETA	.000
□	.900					
○	1.000					

FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

0H12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
□	.850	.000	18.310	ALPHA	.000	BETA
◇	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	25.000	18.310	.000		.000
□	.900					
◇	1.000					

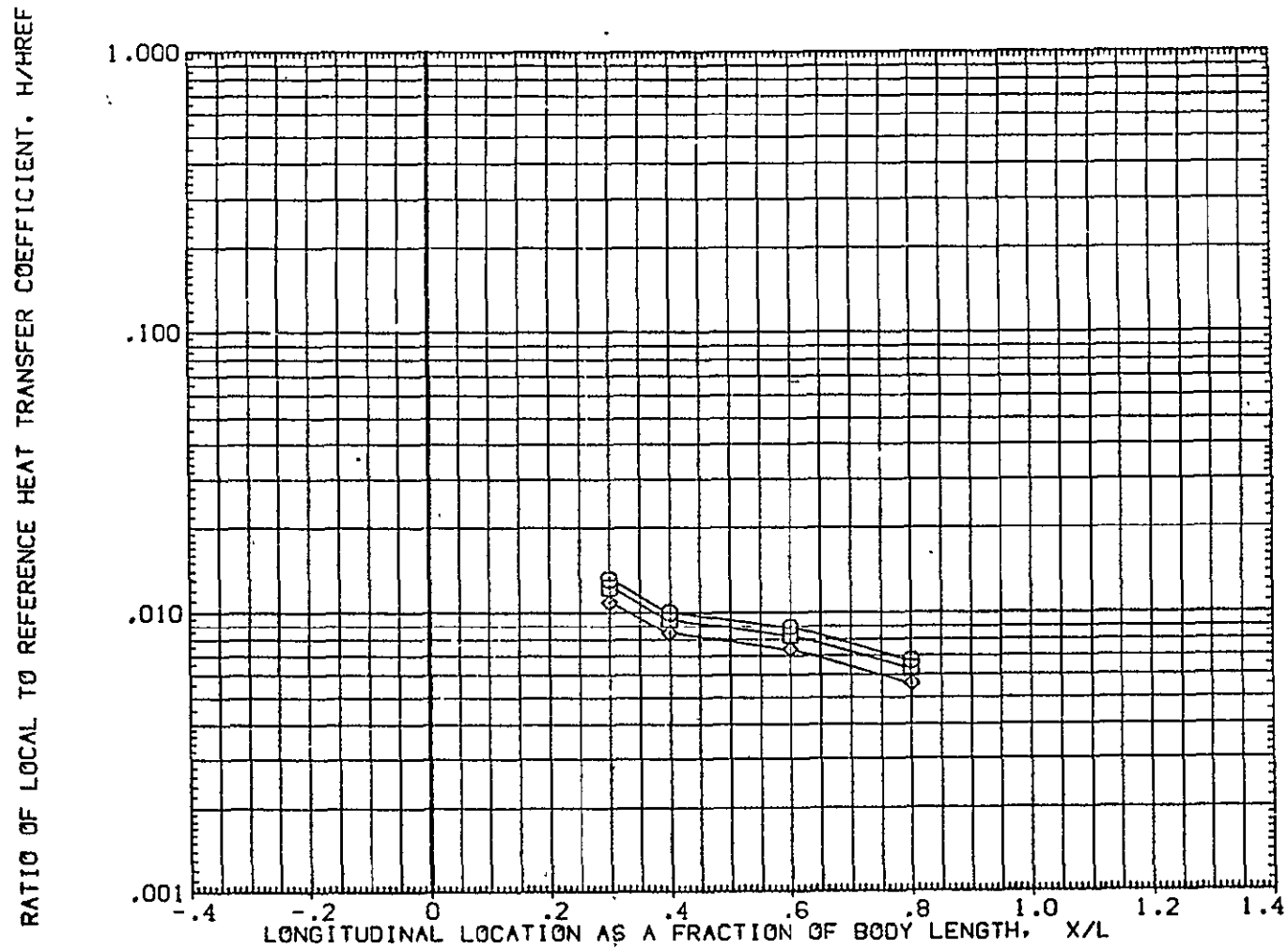


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL

HAW/HT

PHI

MACH

PARAMETRIC VALUES

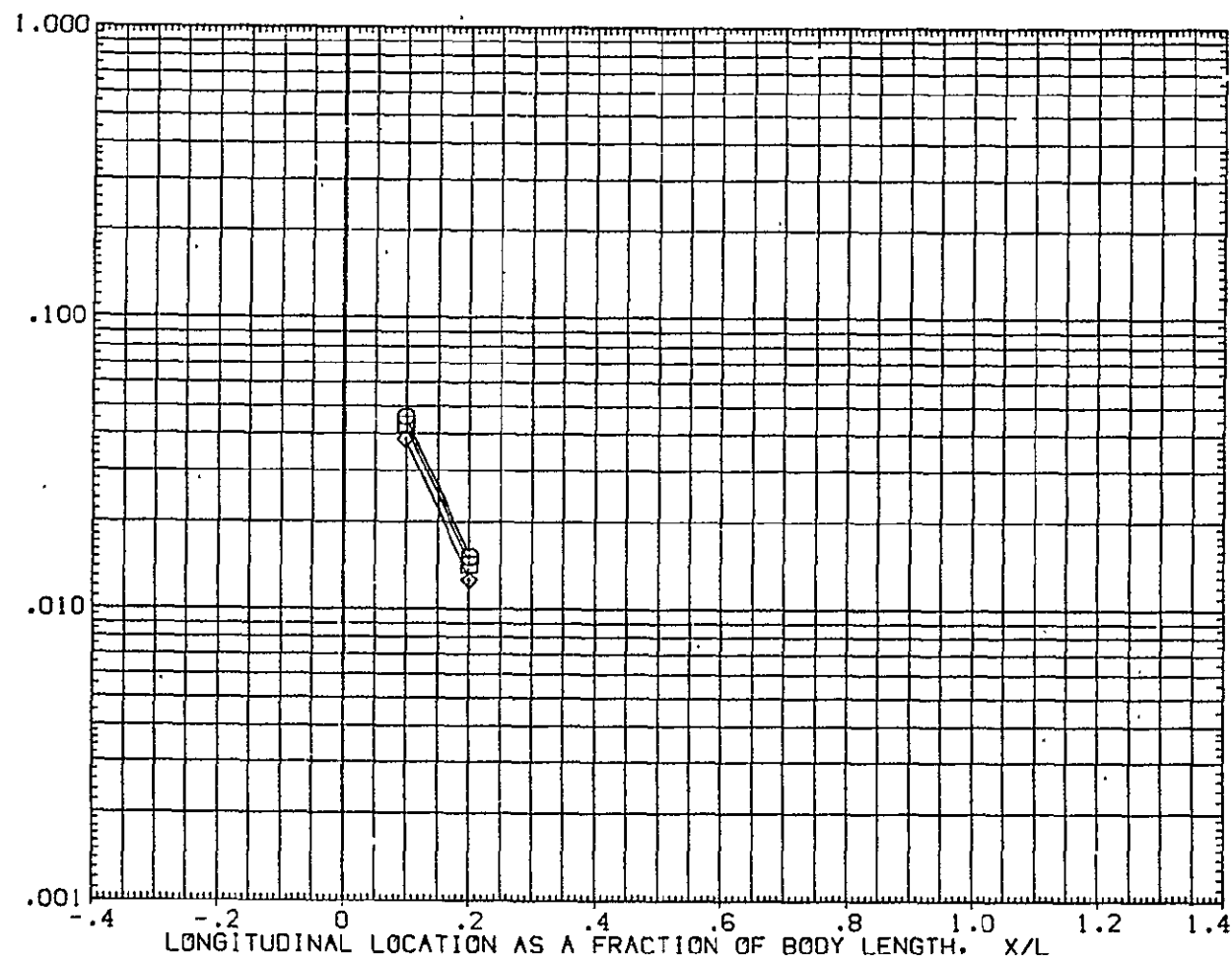
ALPHA

.000

BETA

.000

◇ □ ○

.850
.900
1.000RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

0H12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
◇ □ ○	.850	180.000	18.310	ALPHA	.000	BETA .000
	.900					
	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

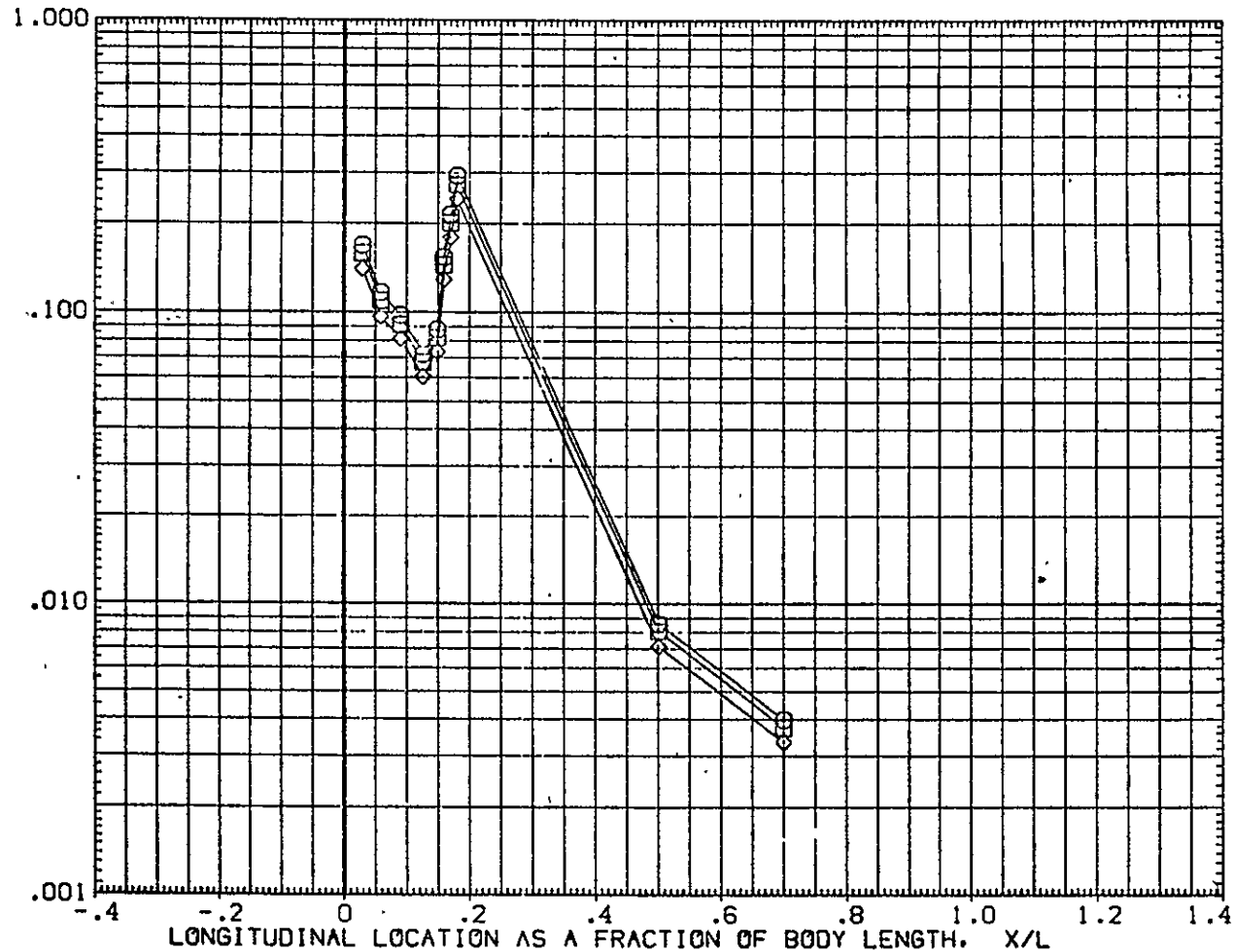
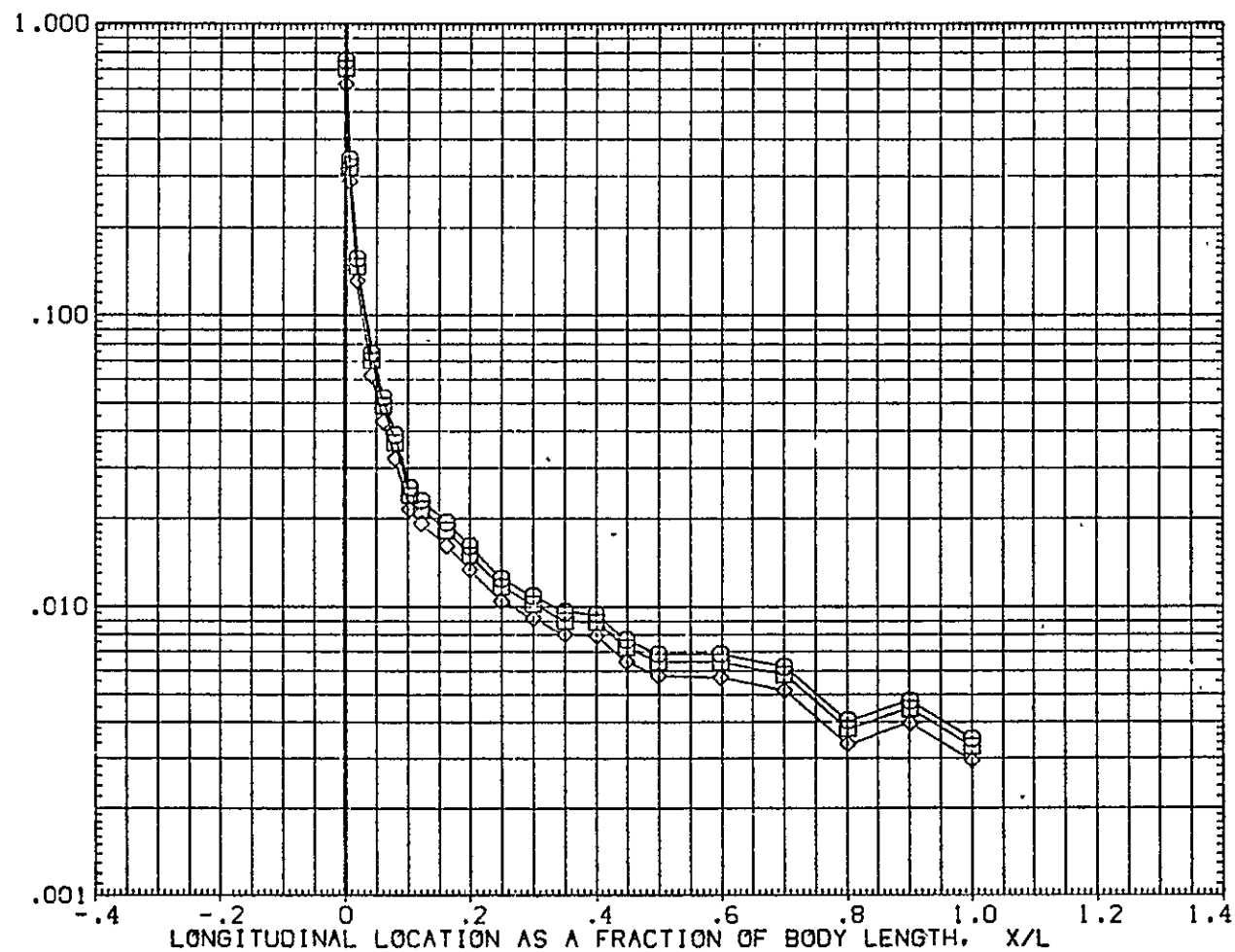


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	.000	19.190			
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	25.000	19.190	.000		.000
□	.900					
○	1.000					

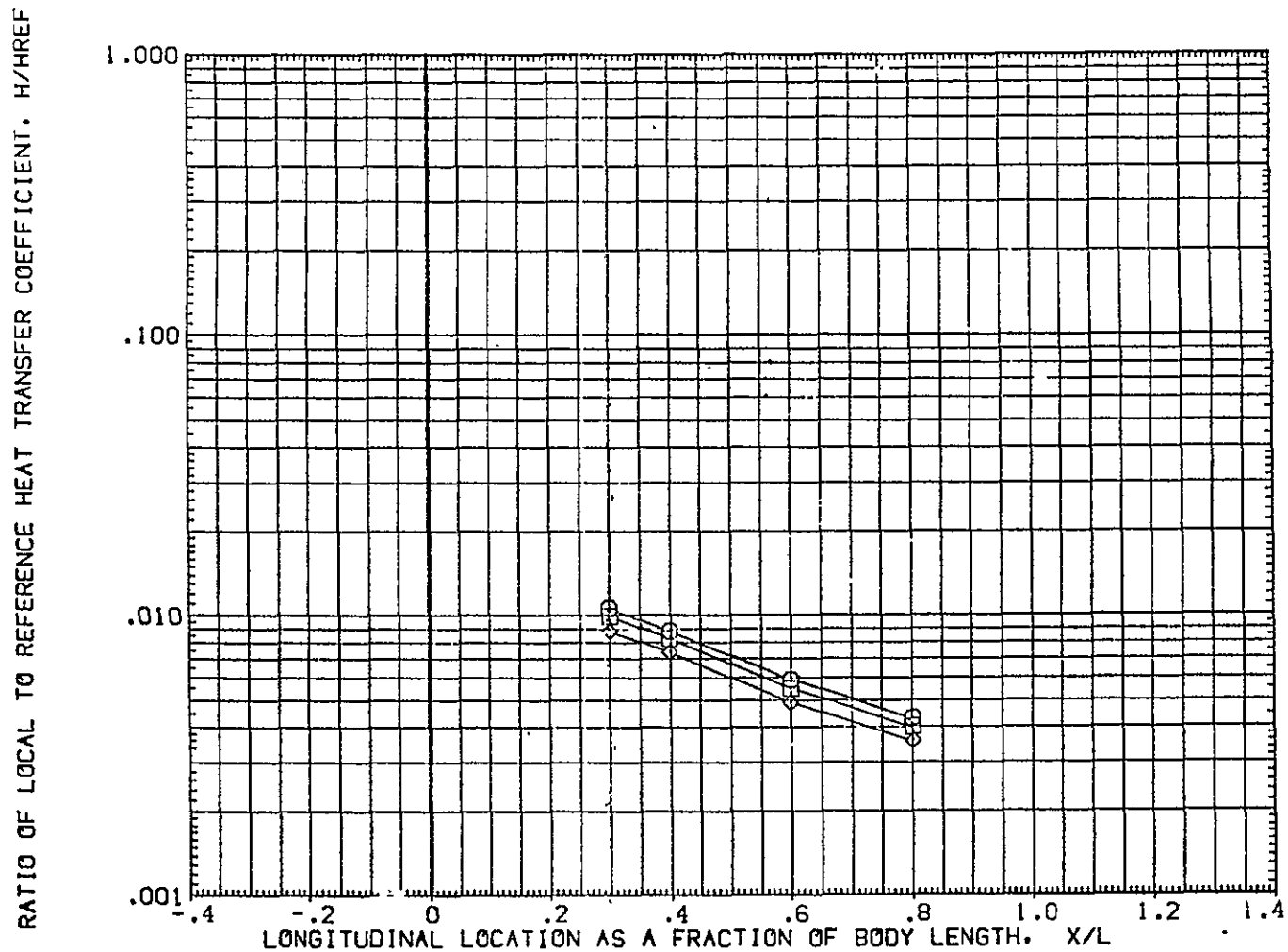


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	30.000	19.190	.000		
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

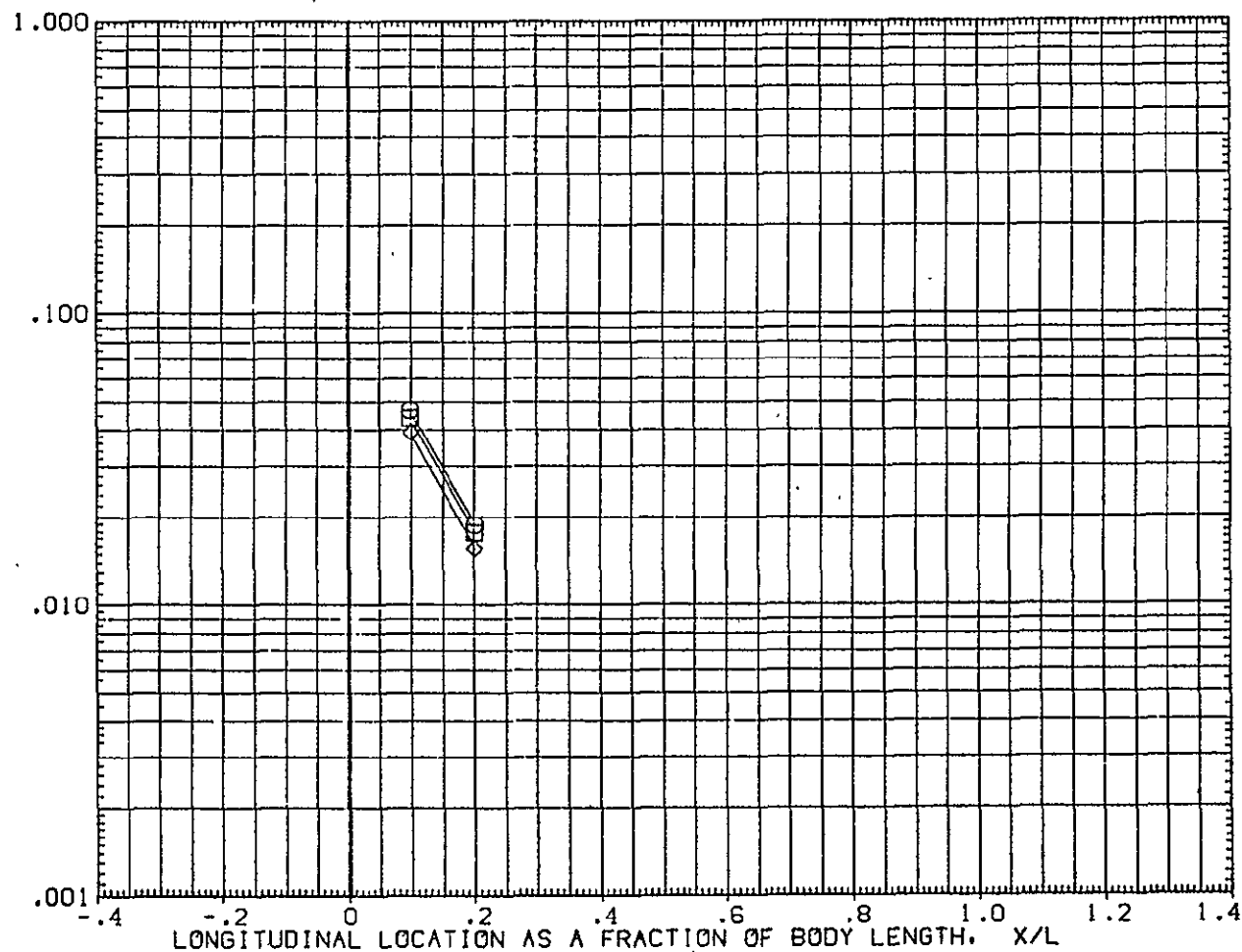


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

CH12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB07)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.850	180.000	19.190		.00L	BETA
□	.900					.000
◇	1.000					

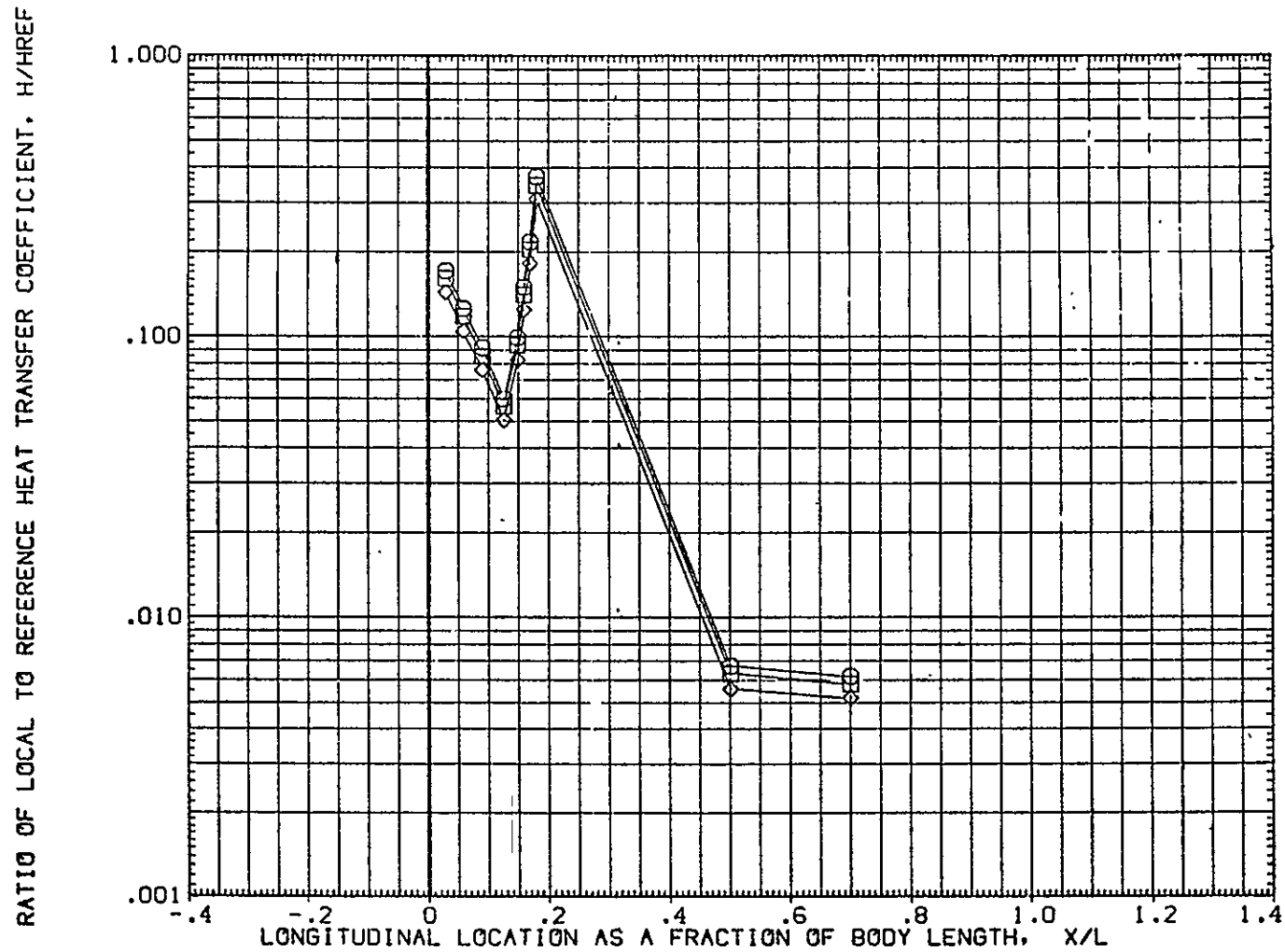


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB05)

SYMBOL	HAY/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	.000	6.999	ALPHA	.000	BETA
□	.900					
◇	1.000					

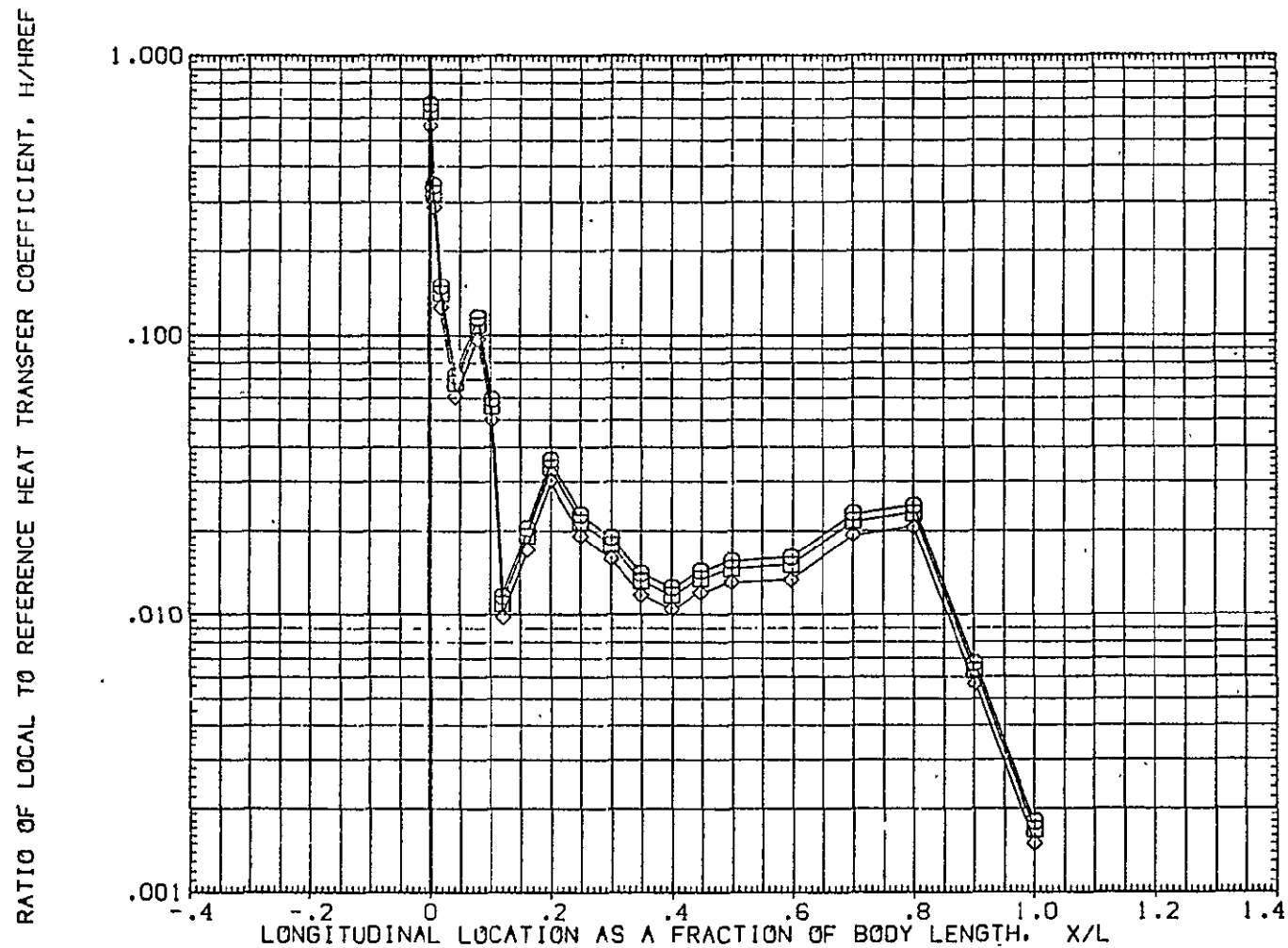


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUG805)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	25.000	6.999	ALPHA	.000	BETA
□	.900					
◇	1.000					.000

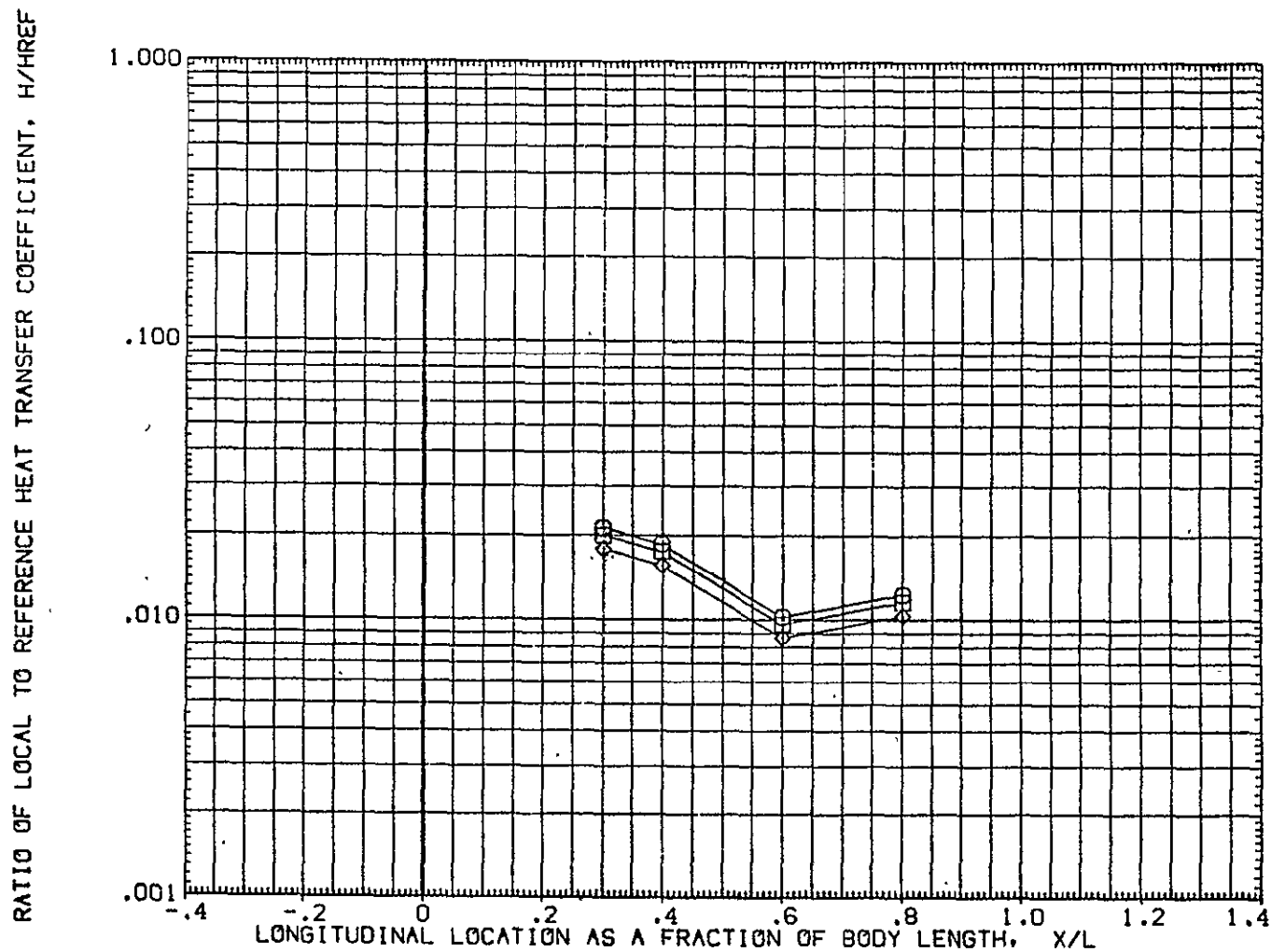


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	30.000	6.999	.000		
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

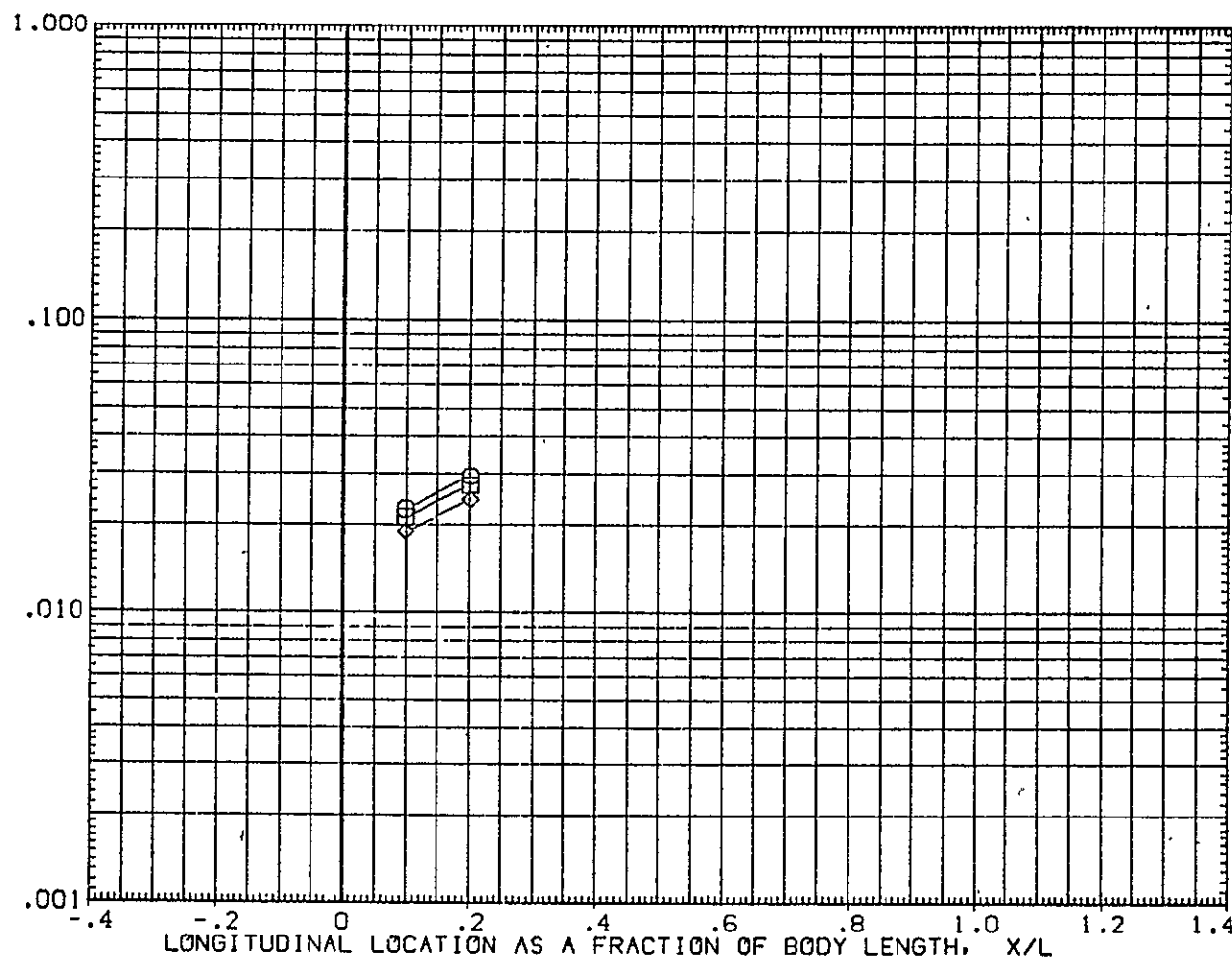


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

0H12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB05)

SYMBOL	MAV/HT	PHI	MACH	PARAMETRIC VALUES		
◇	.850	180.000	6.999	ALPHA	.000	BETA
□	.900					
◇	1.000					.000

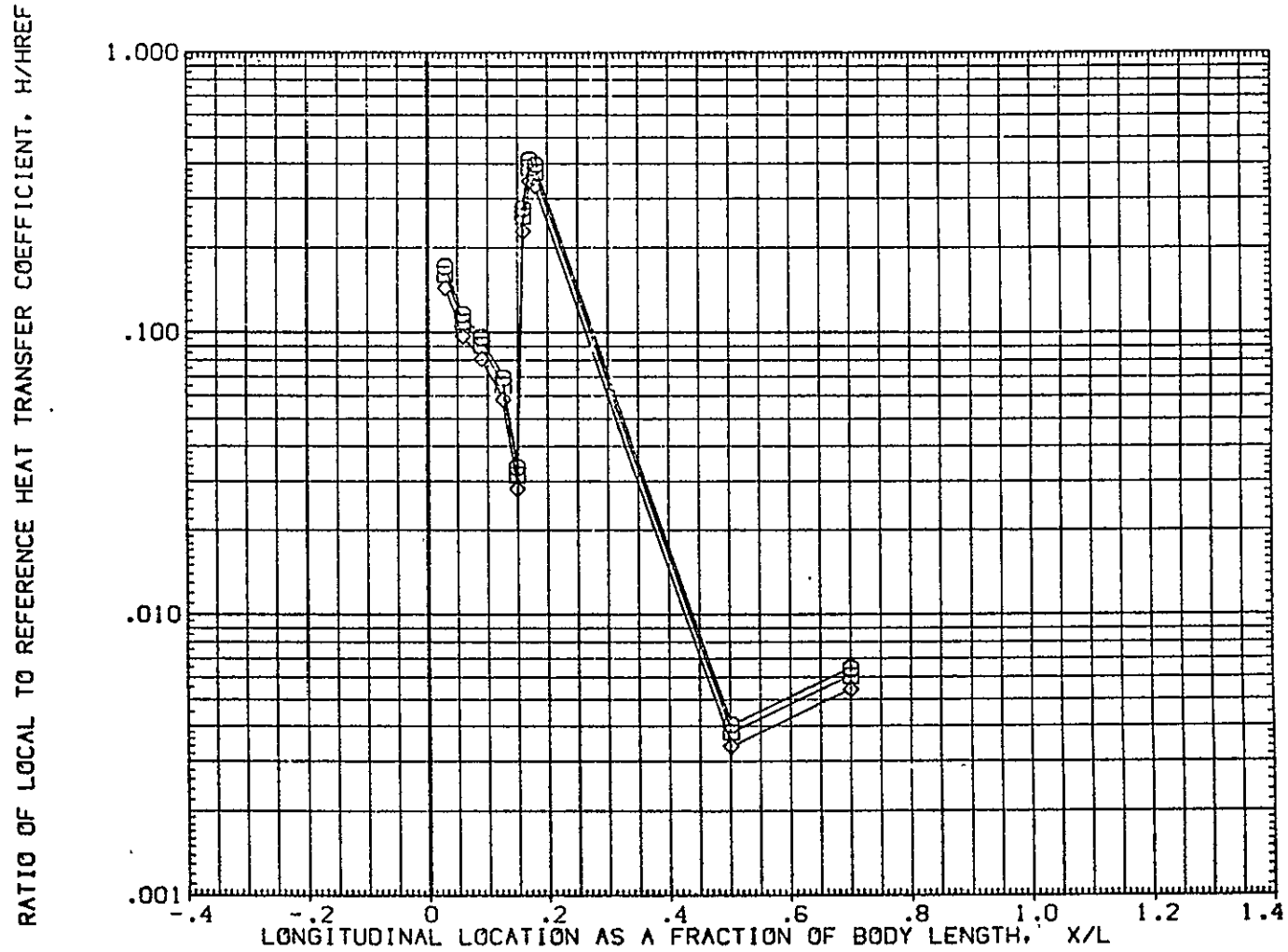


FIG. 8. EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	.000	7.616	ALPHA	.000	BETA
□	.900					
◇	1.000					

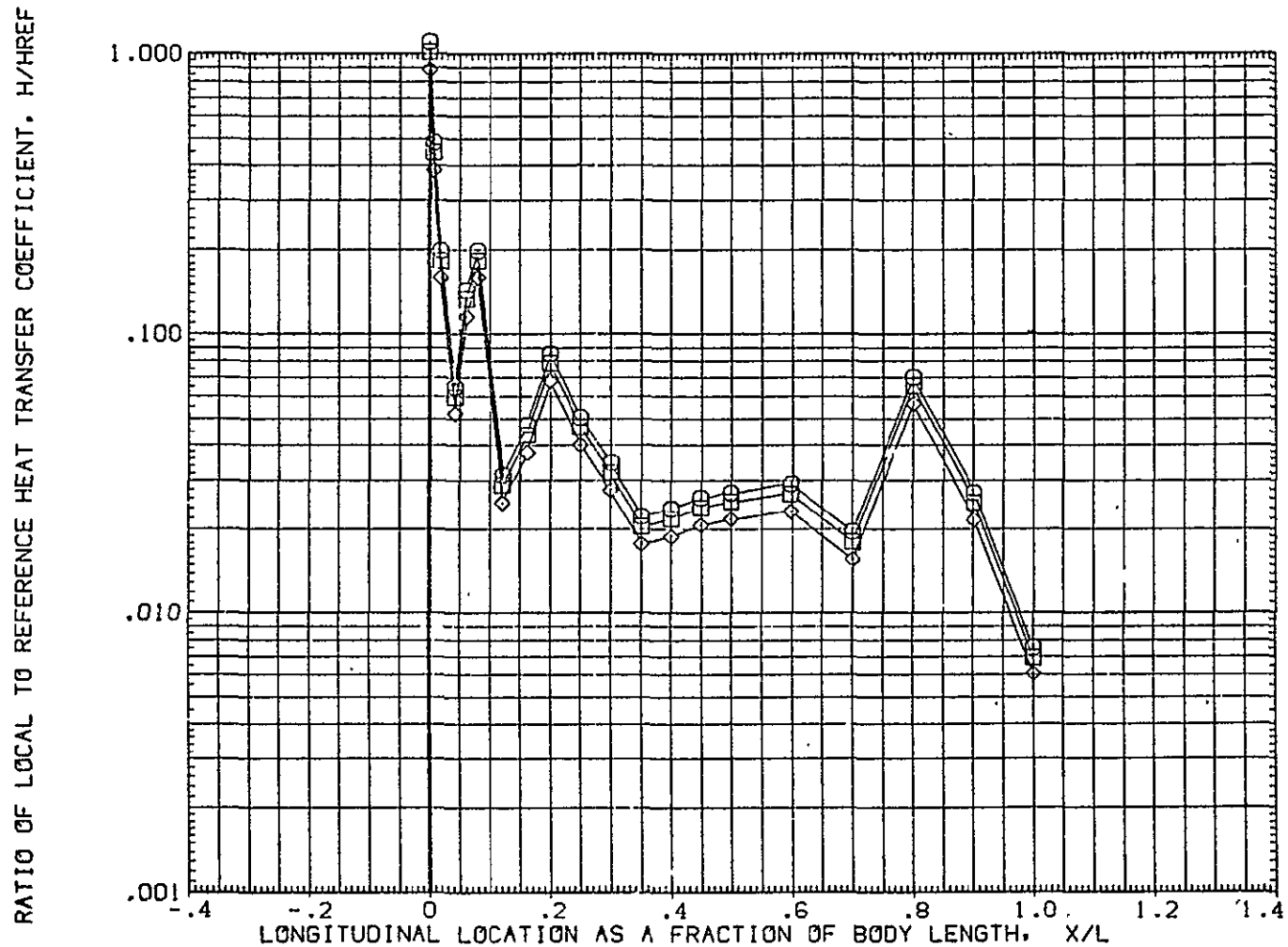


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
□	.850	25.000	7.616	ALPHA,	.000	BETA
◇	1.000					.000

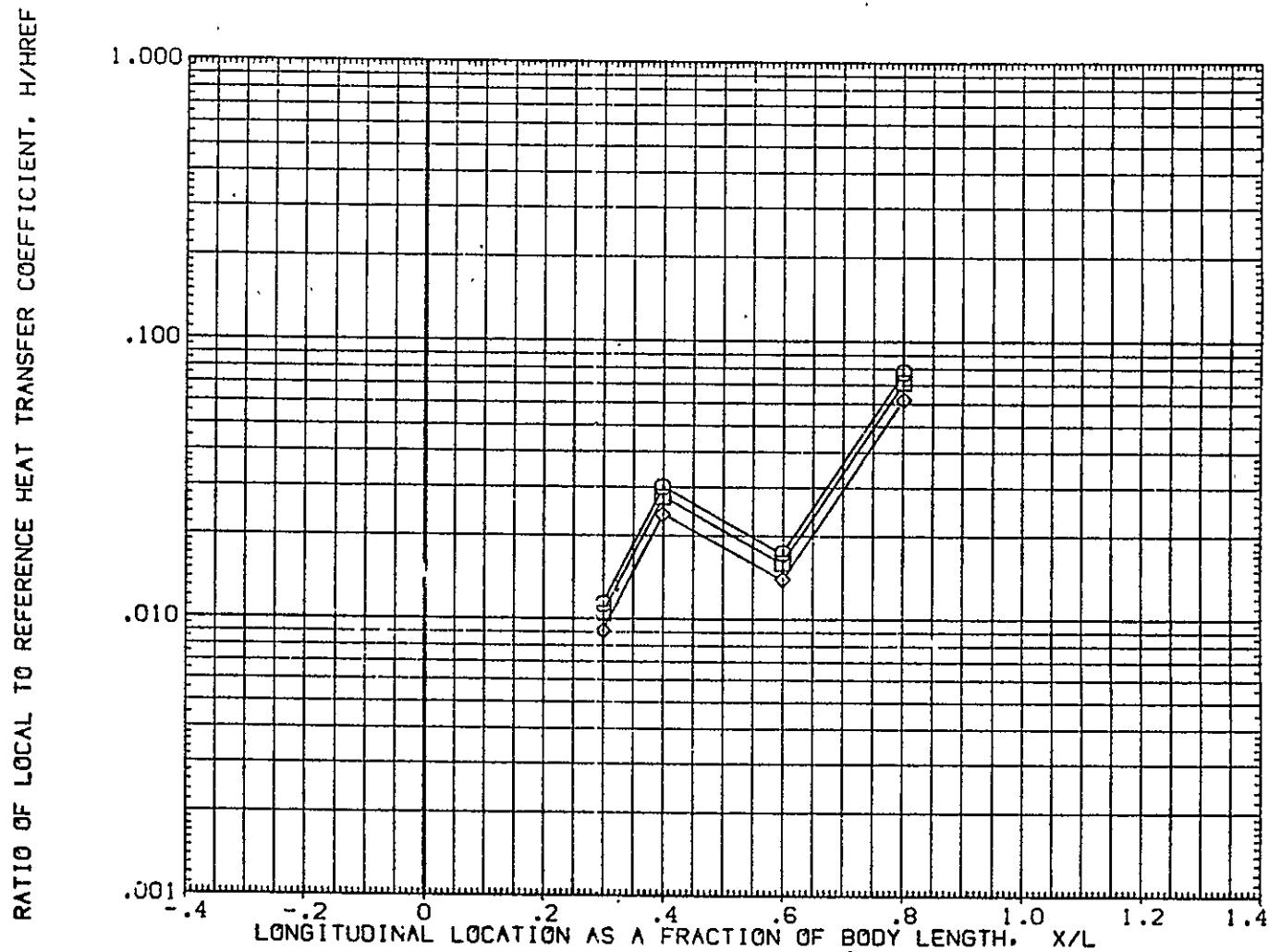


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	30.000	7.616	.000	.000	
□	.900					
◇	1.000					

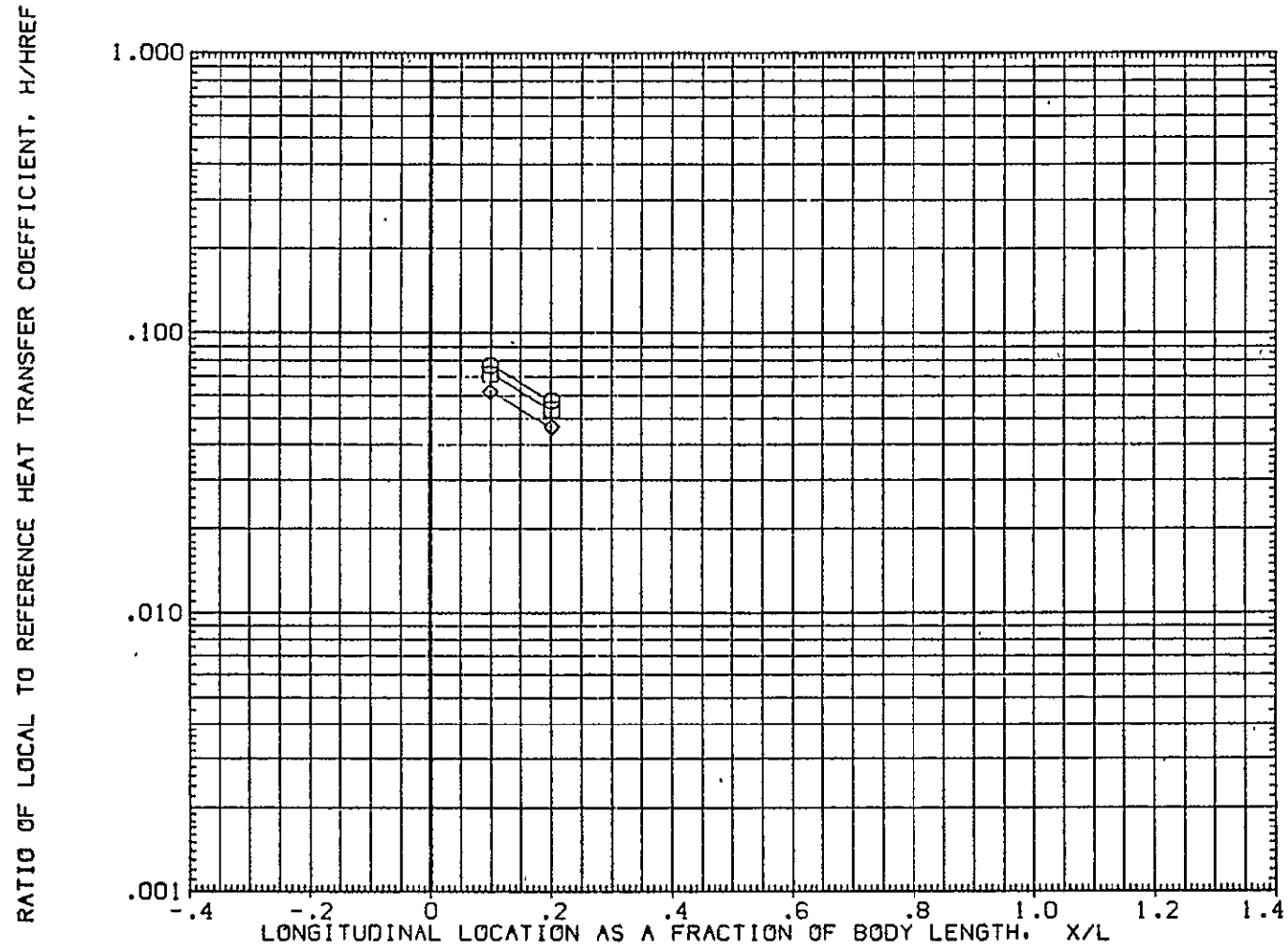


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB05)

SYMBOL	HAY/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.850	180.000	7.616	.000	BETA	.000
□	.900					
◇	1.000					

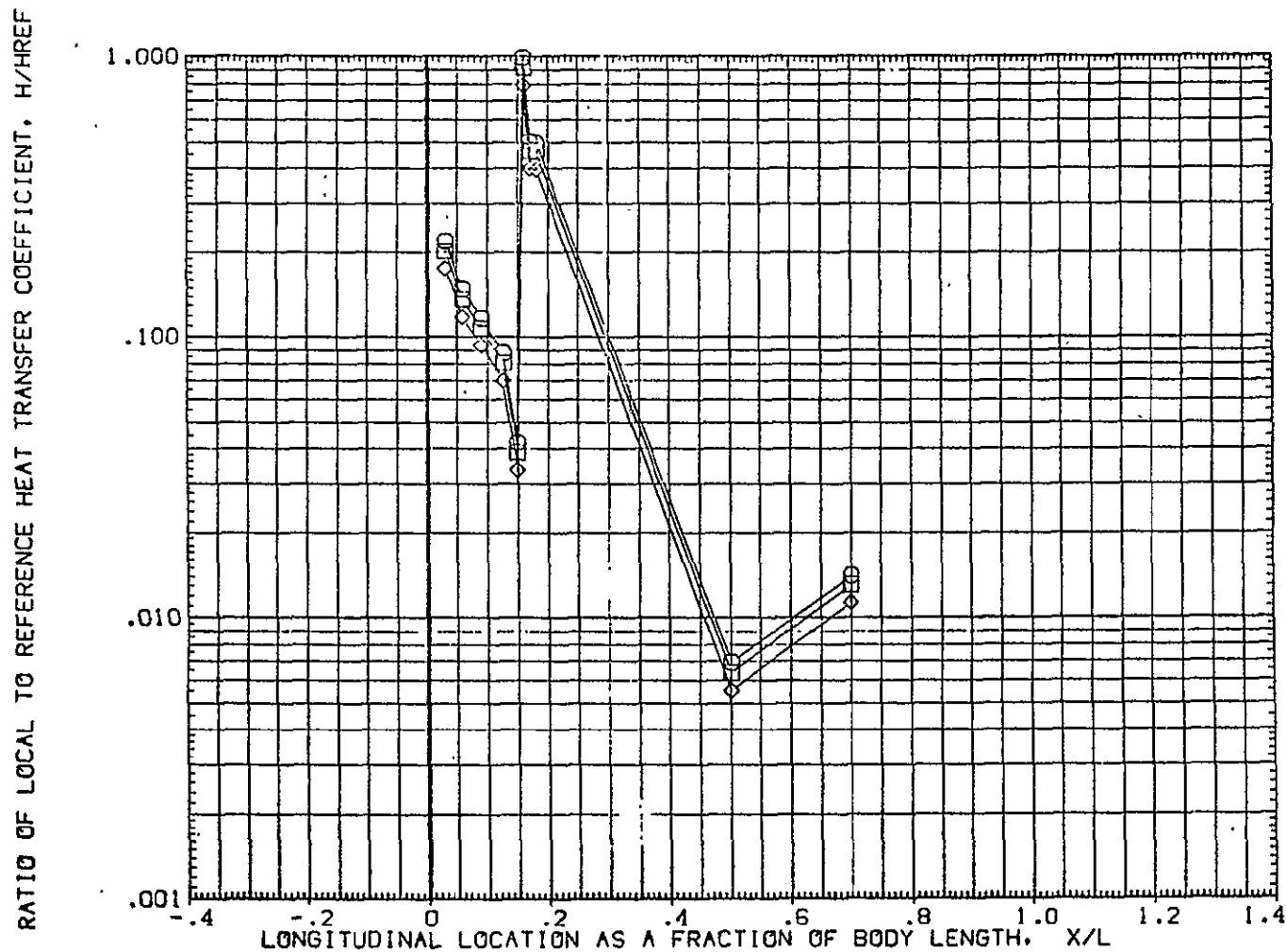


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	.000	18.330	.000	.000	.000
□	.900					
○	1.000					

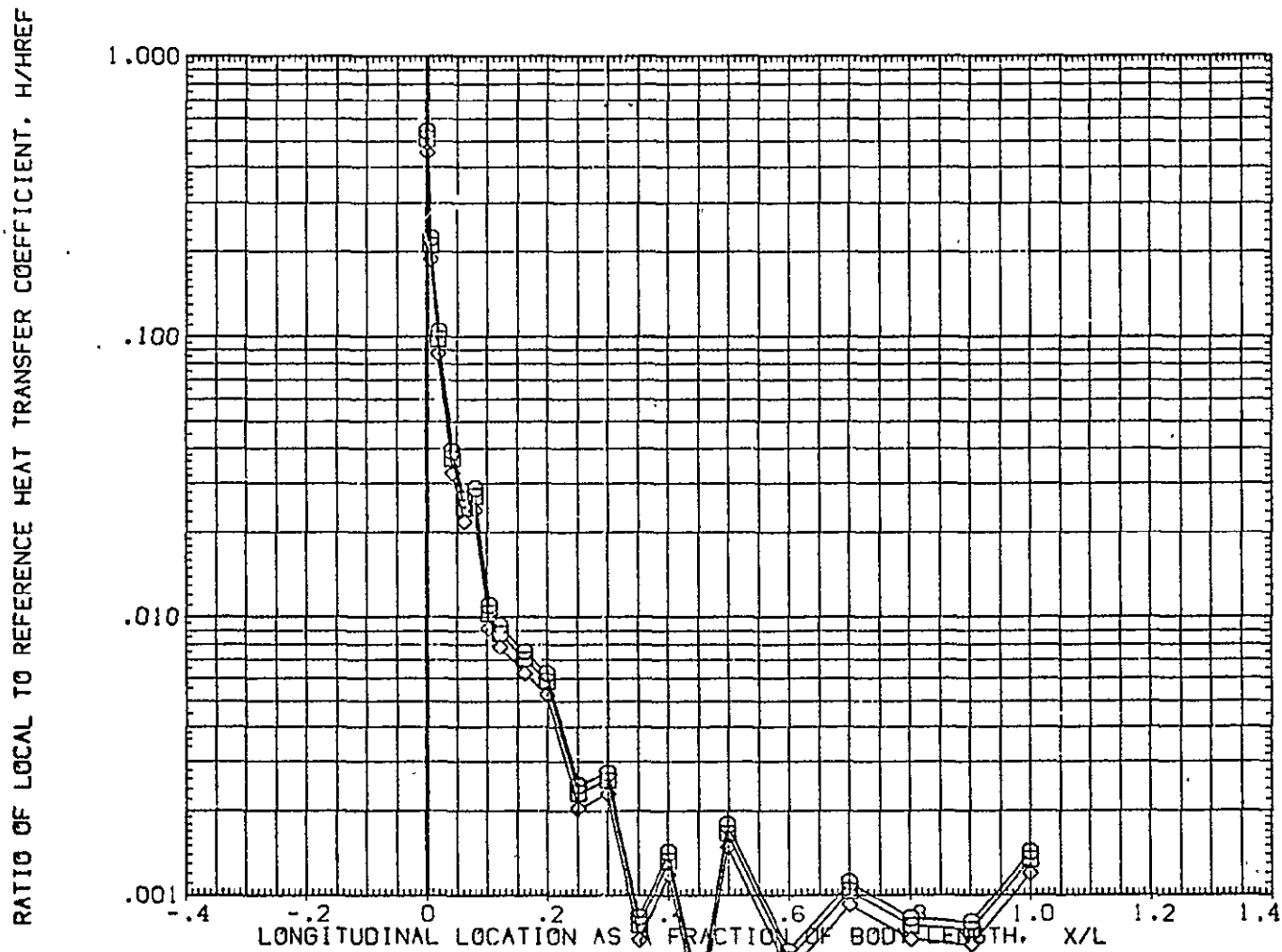


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES		
○	.850	25.000	18.330	.000	BETA	.000	
□	.900						
◇	1.000						

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

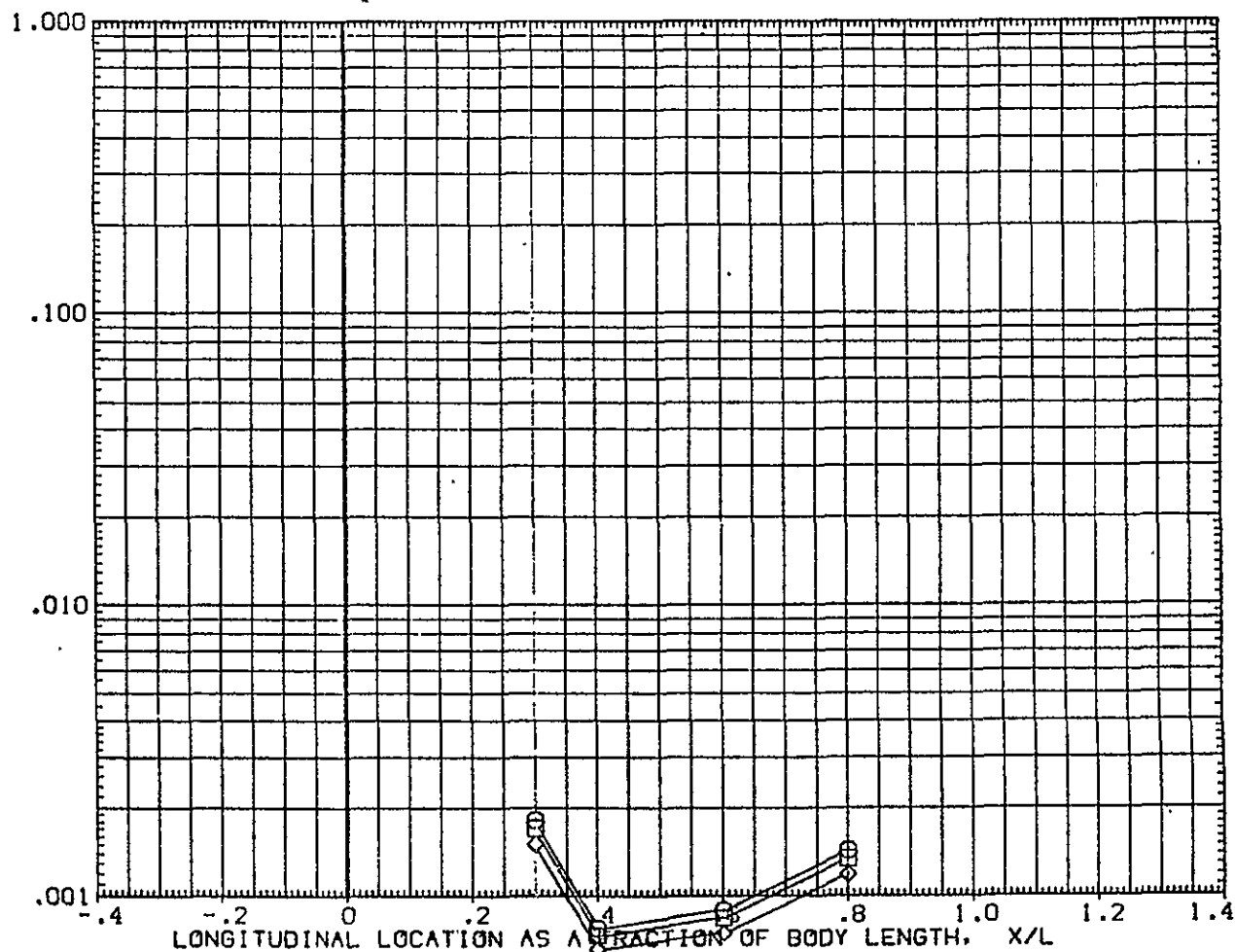


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	30.000	18.330	.000		.000
◇	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

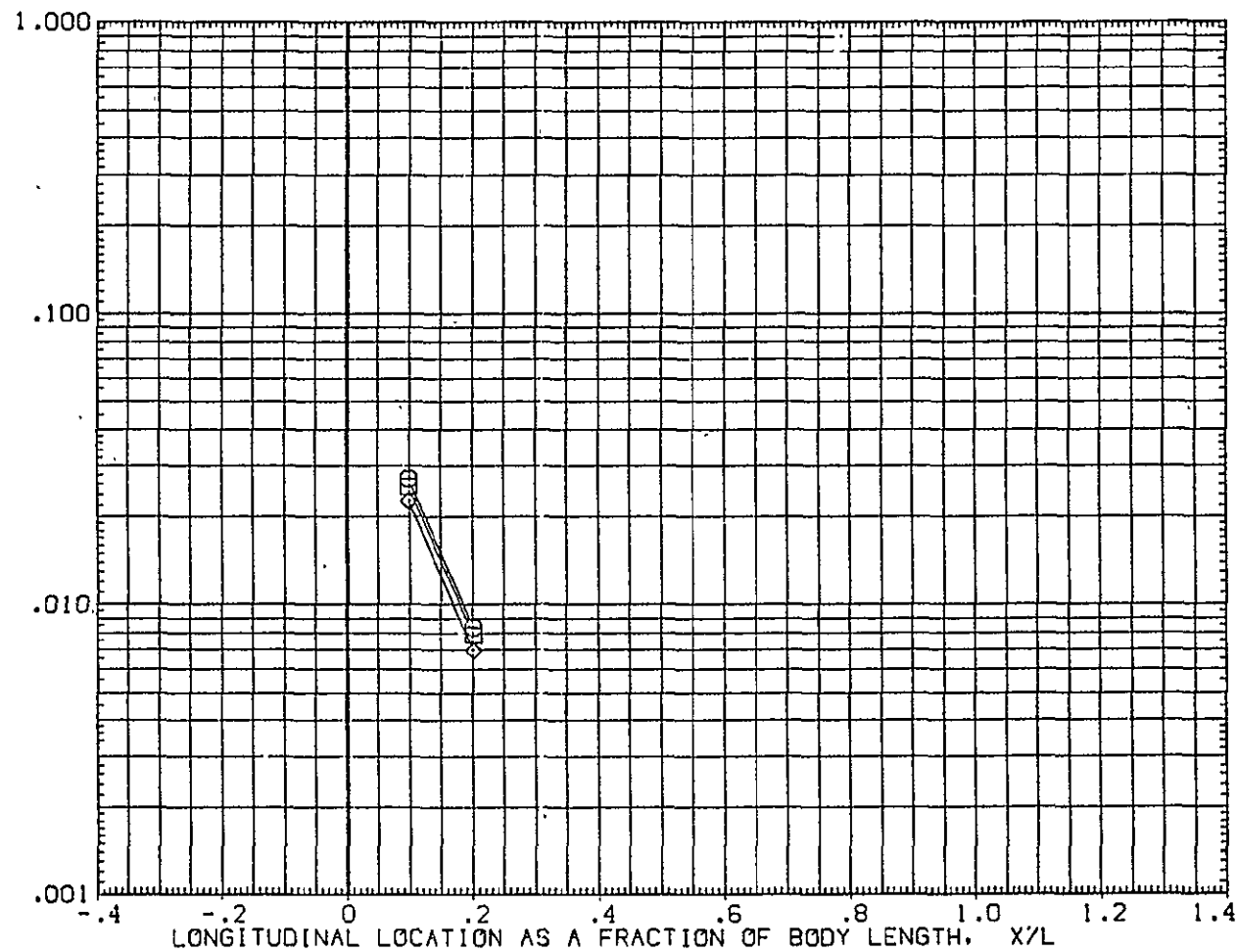


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR.

OH12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	180.000	18.330	.000	.000	.000
□	.900					
◇	1.000					

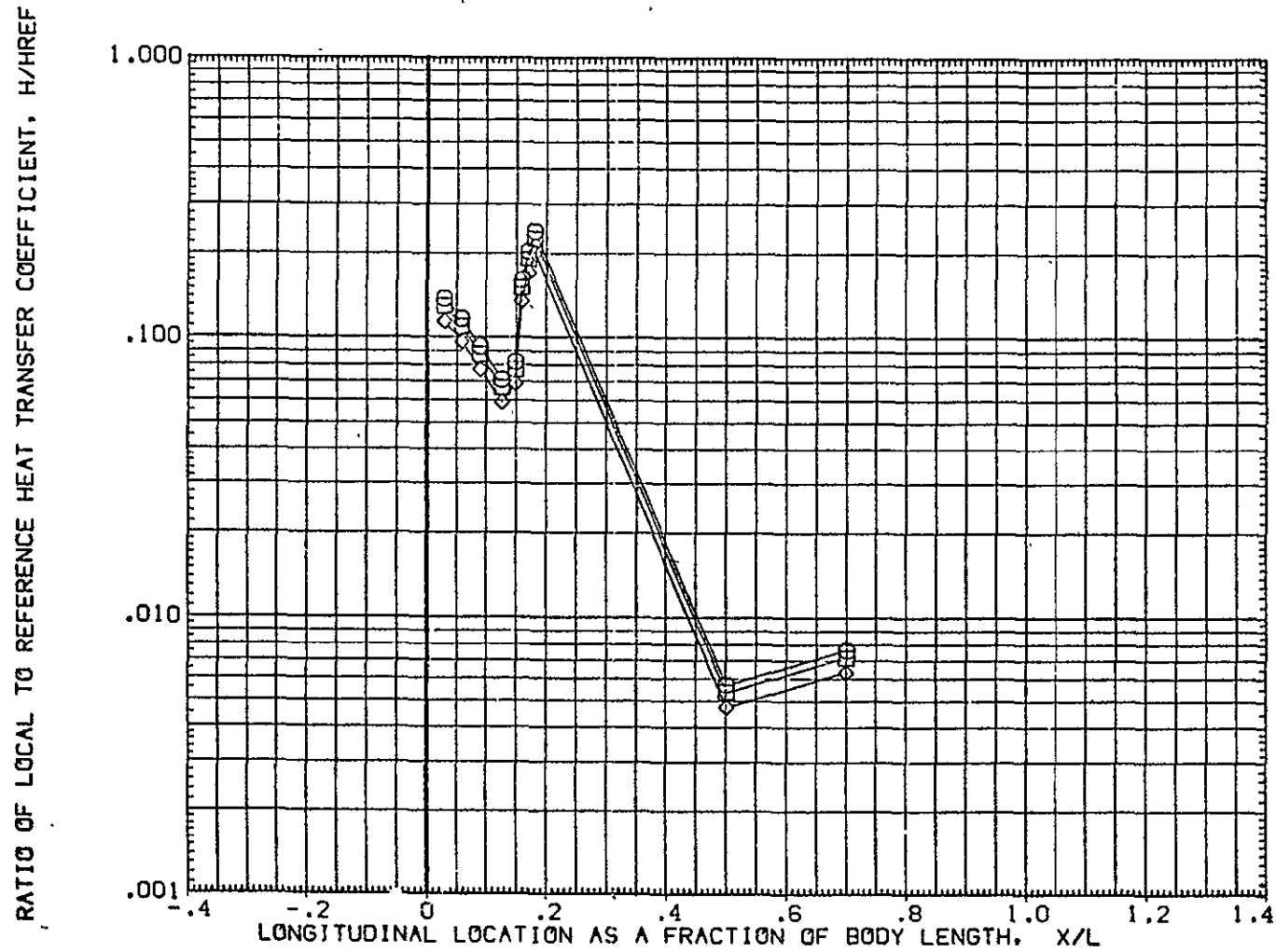


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	.000	19.200	.000	.000	
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

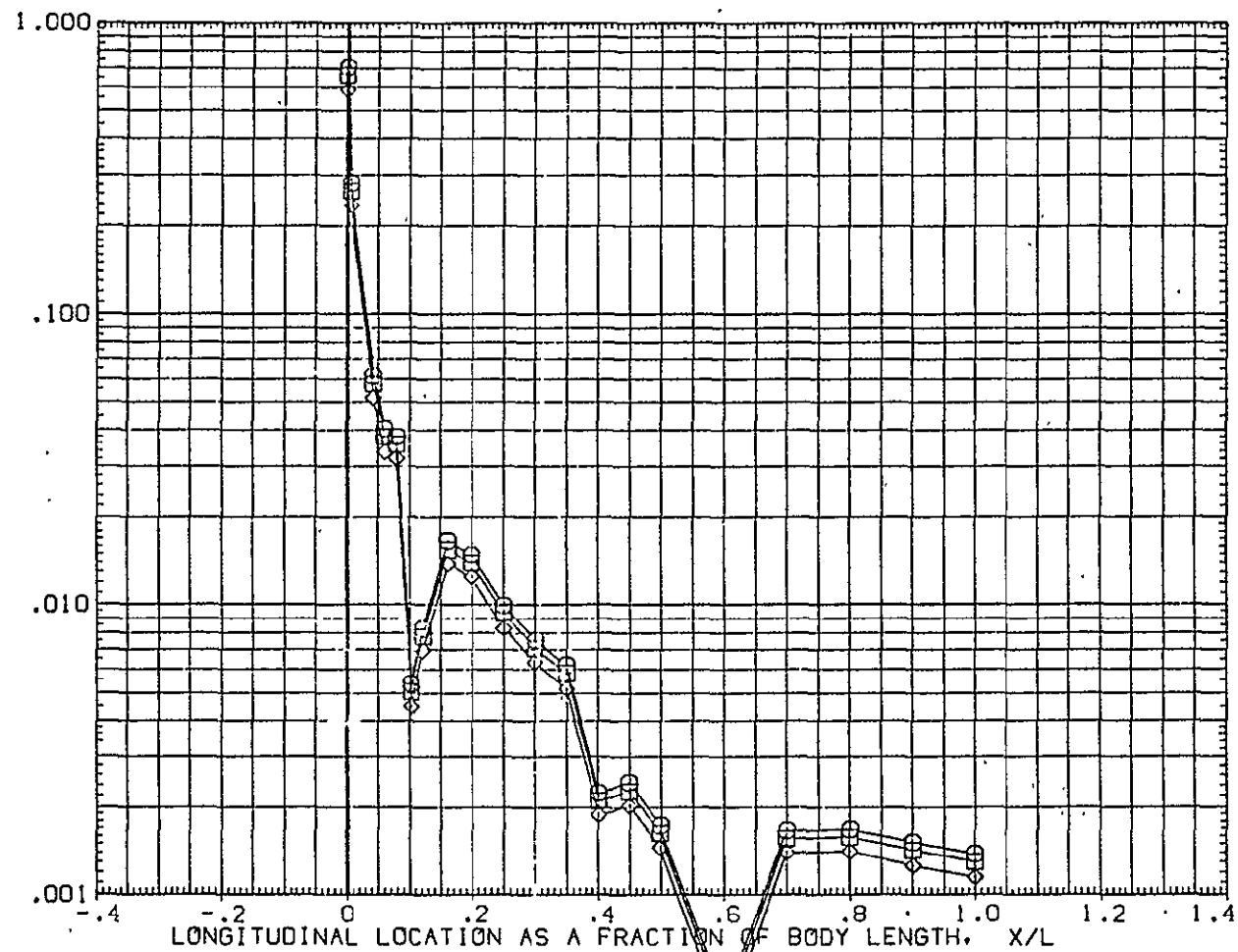


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	25.000	19.200	.000		.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

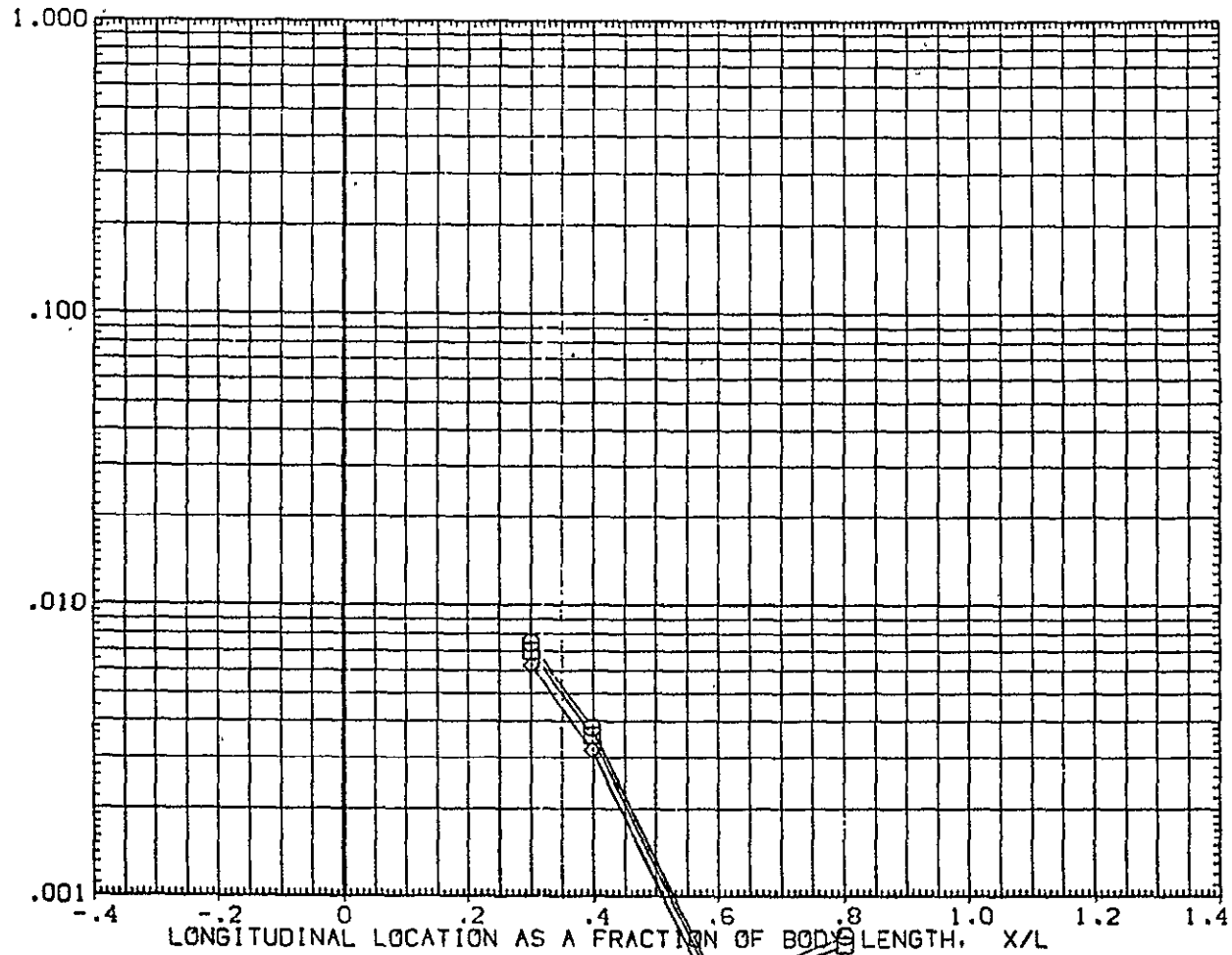


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES		BETA	
◇	.850	30.000	19.200		.000			.000
□	.900							
◇	1.000							

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

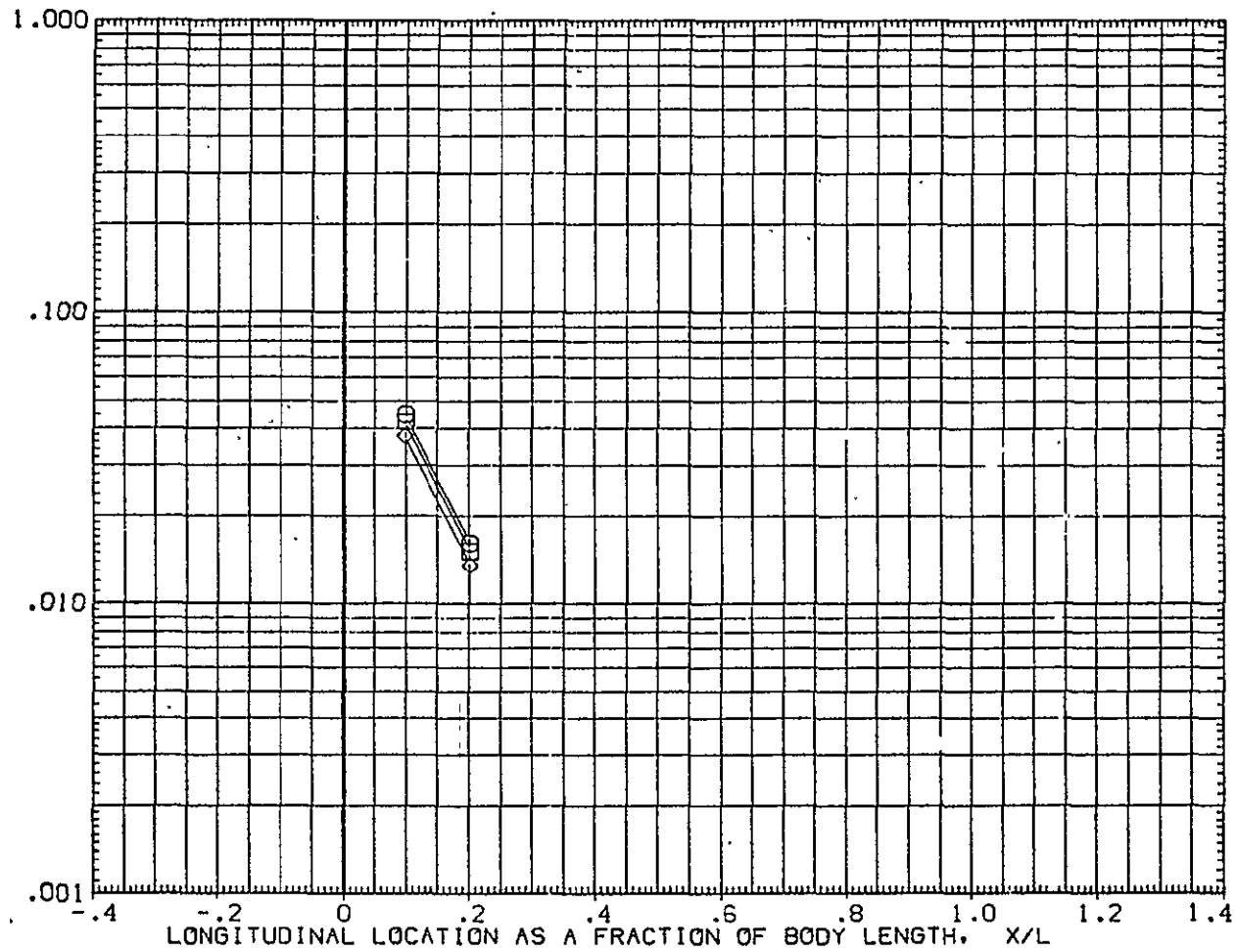


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

0H12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	180.000	19.200	.000		.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

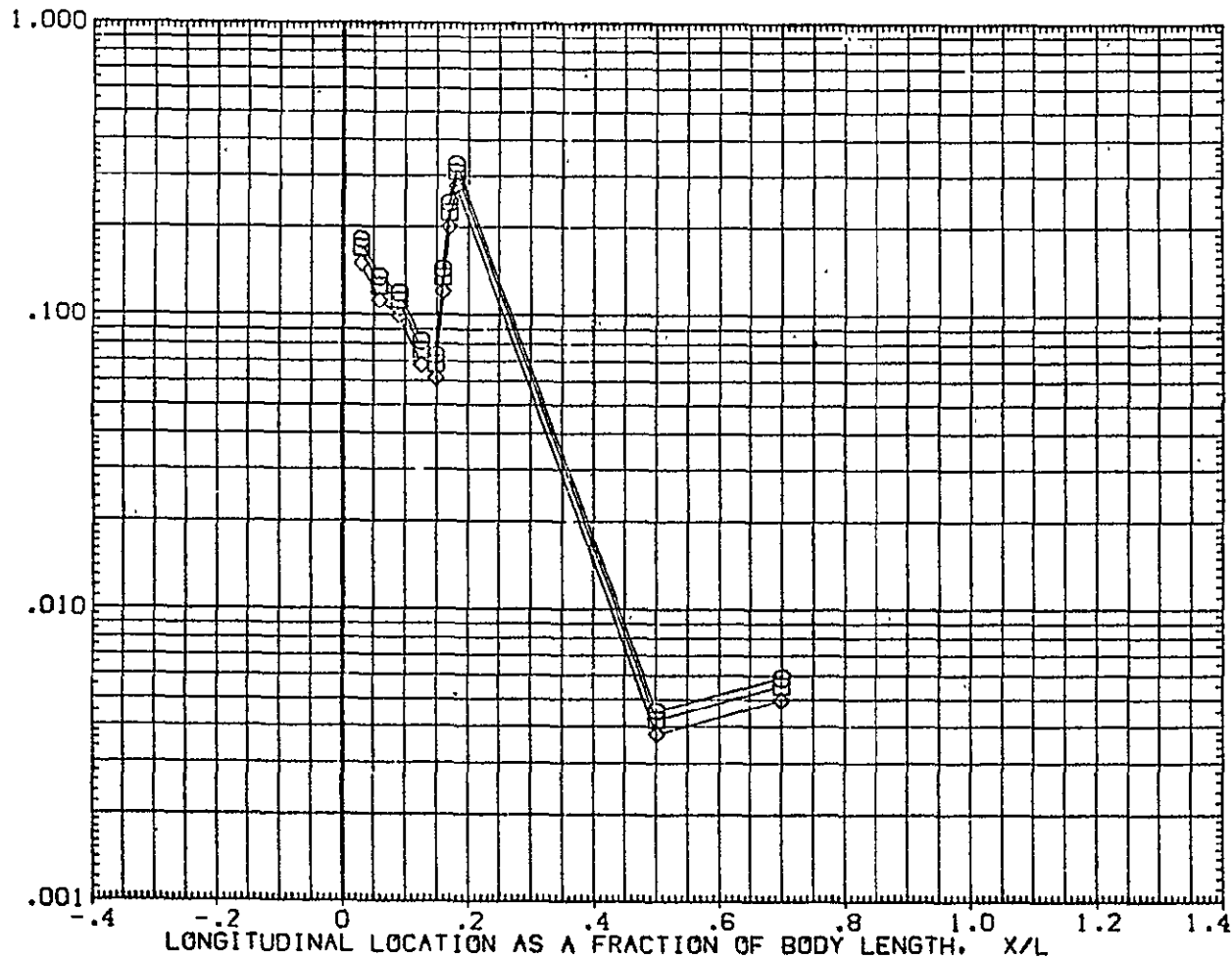


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/0(07) FUSELAGE (IUGB05)

SYMBOL	NAV/HT	PHI	MACH	PARAMETRIC VALUES		
O	.300	.000	7.000	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

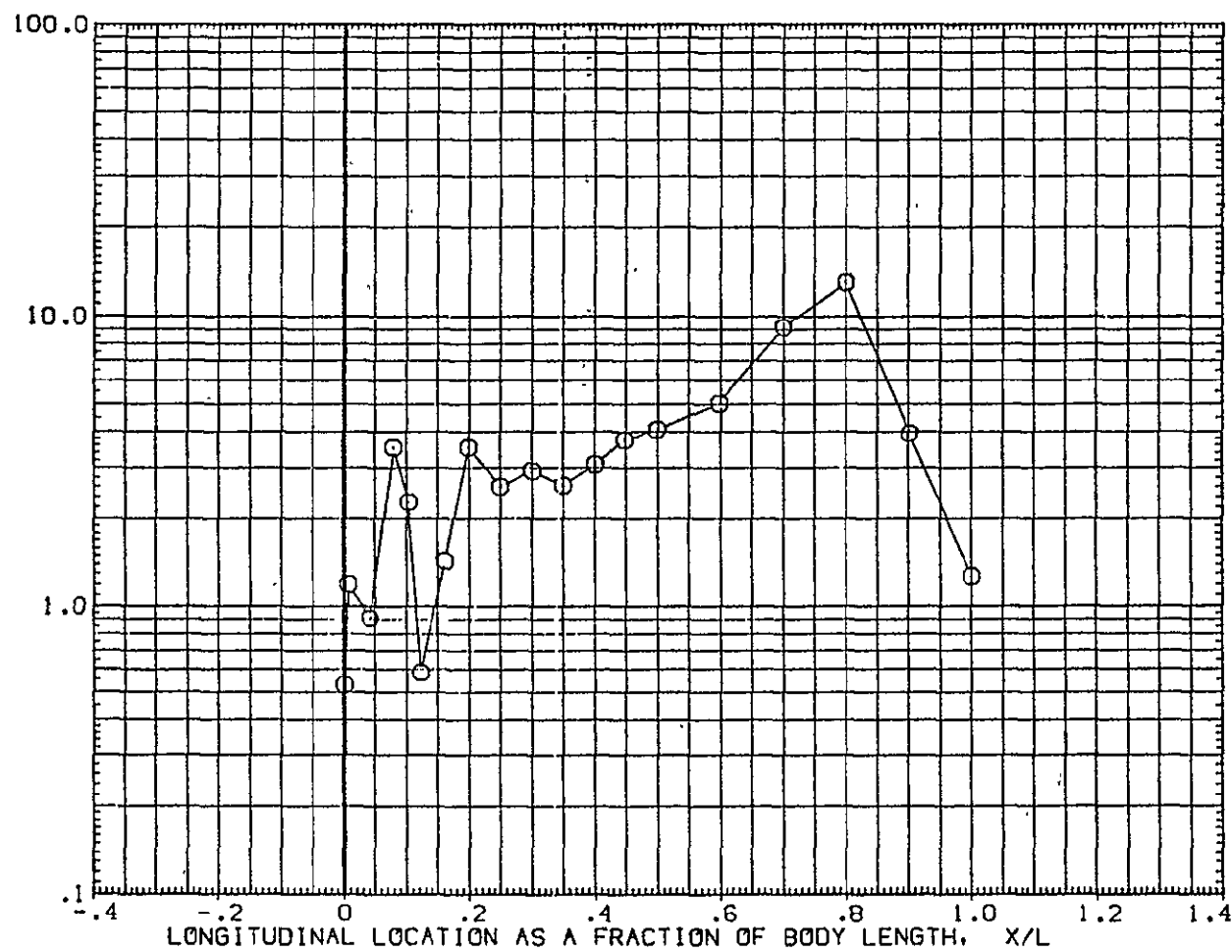


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

OH12 + IH21 MODEL 37 OT(05)/O(07) FUSELAGE (IUG805)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
O	.900	25.000	7.000	.000	BETA	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

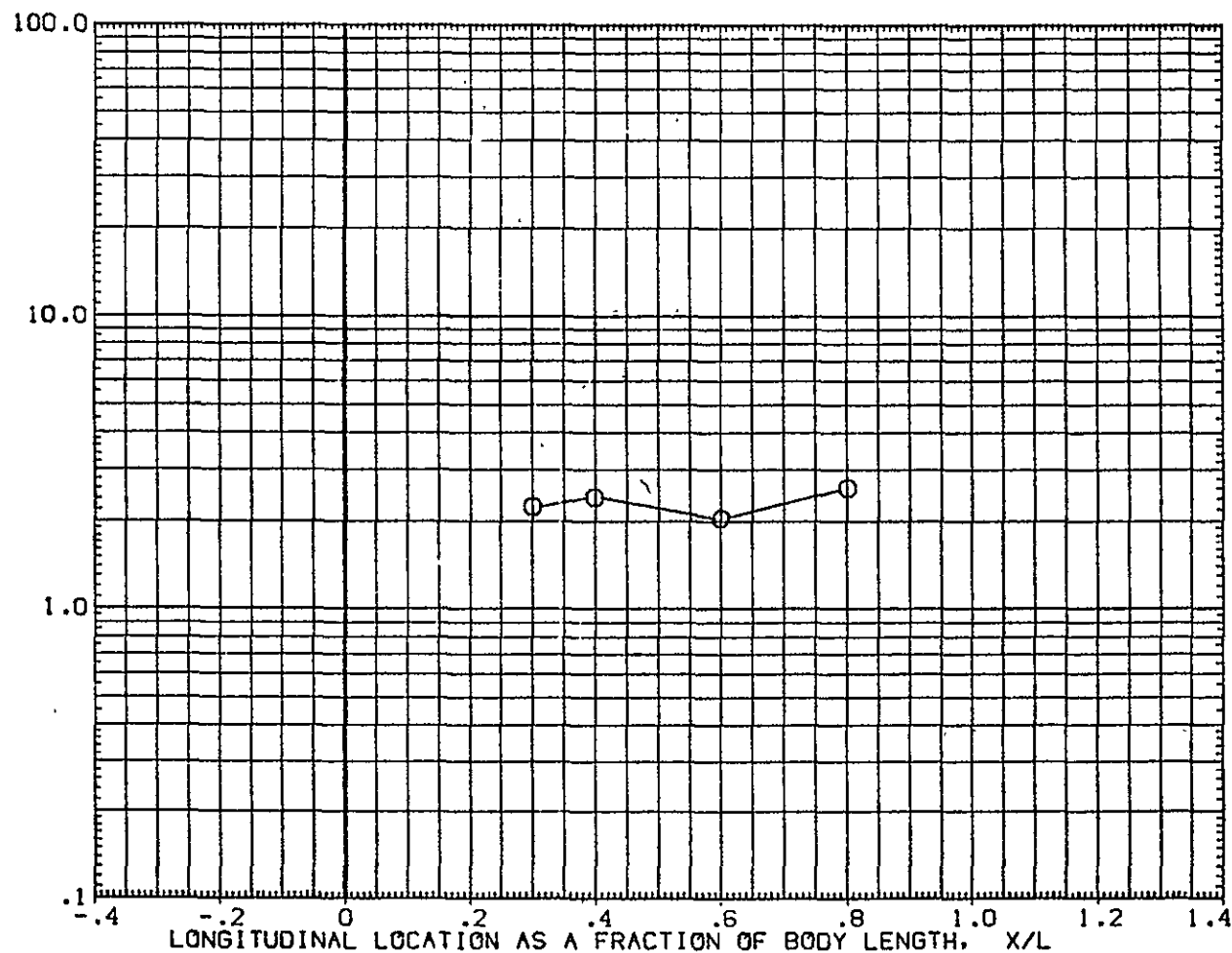


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 0T(05)/0(07) FUSELAGE (IUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.900	30.000	7.000	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

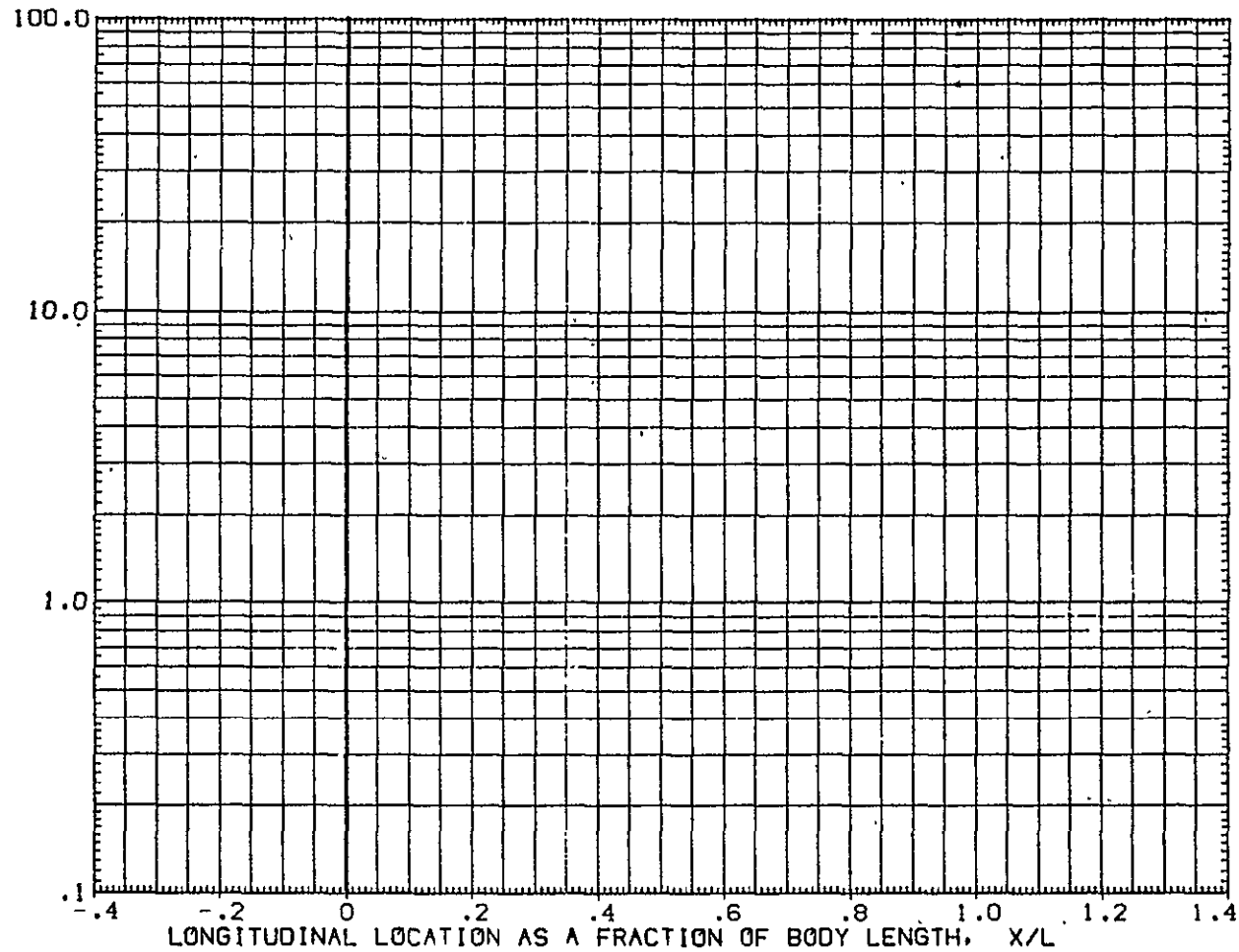


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/O(07) FUSELAGE (IUGB05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
O	.900	180.000	7.000		.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

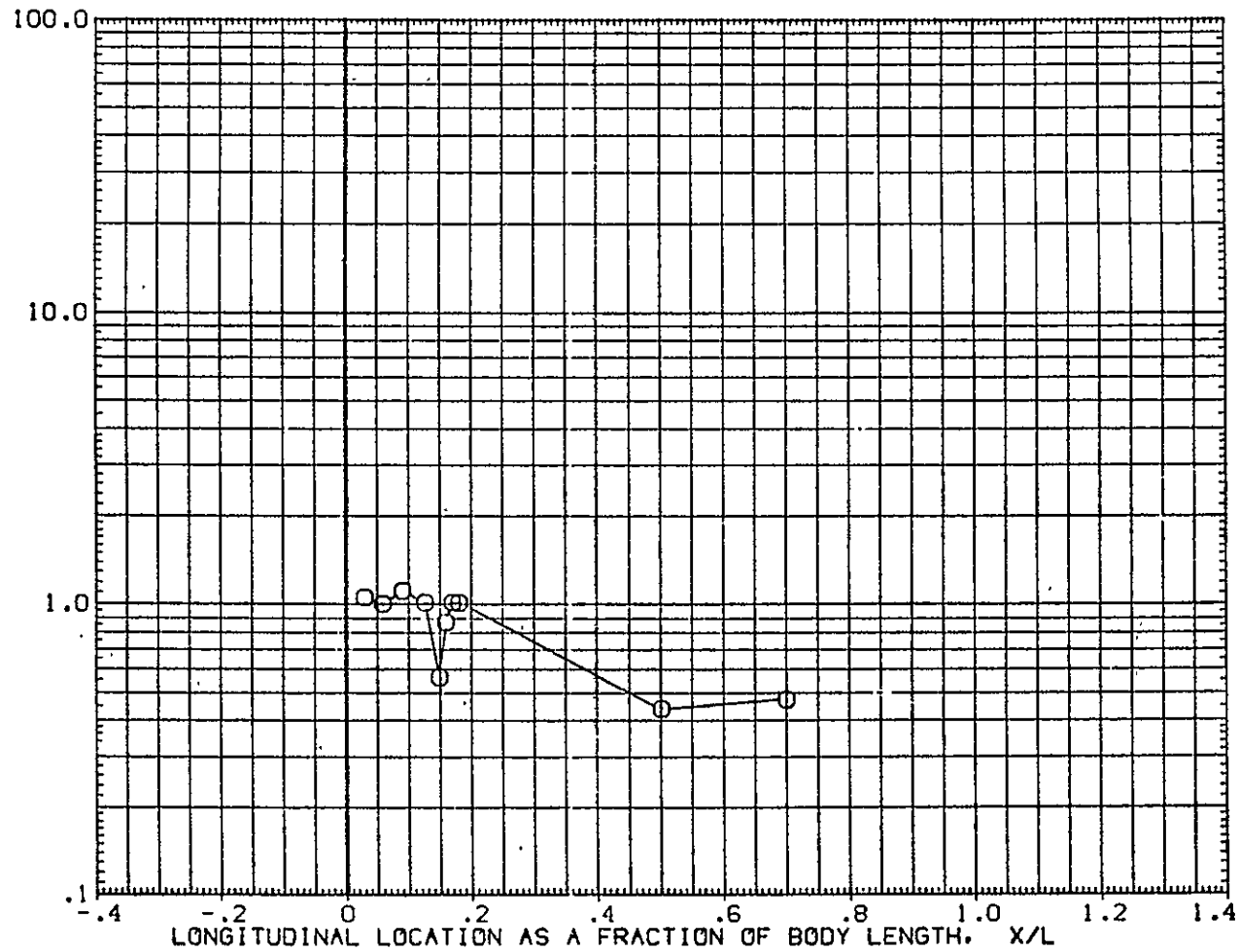


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/O(07) FUSELAGE (IUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
O	.900	.000	7.610	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

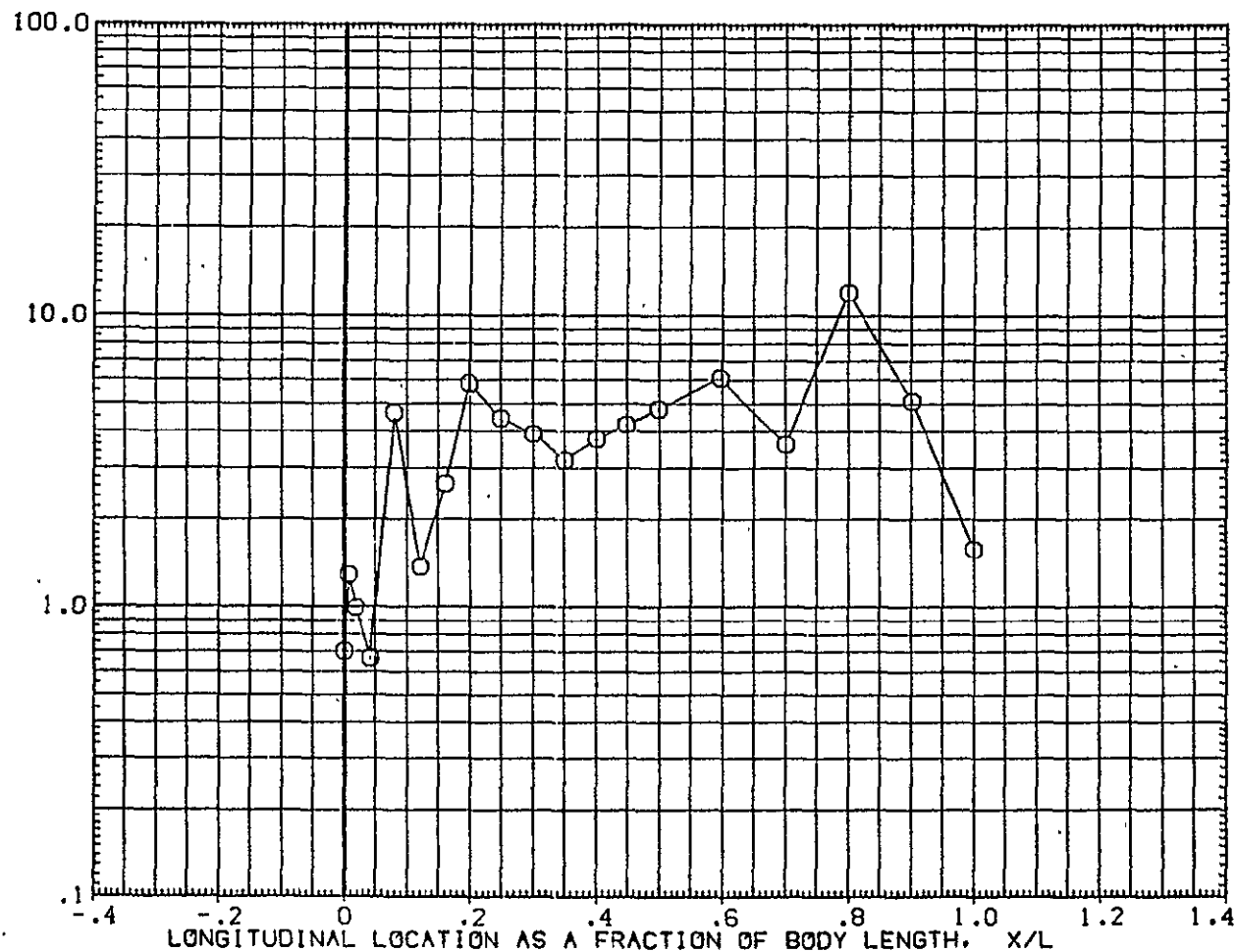


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/O(07) FUSELAGE (IUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.900	25.000	7.610	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

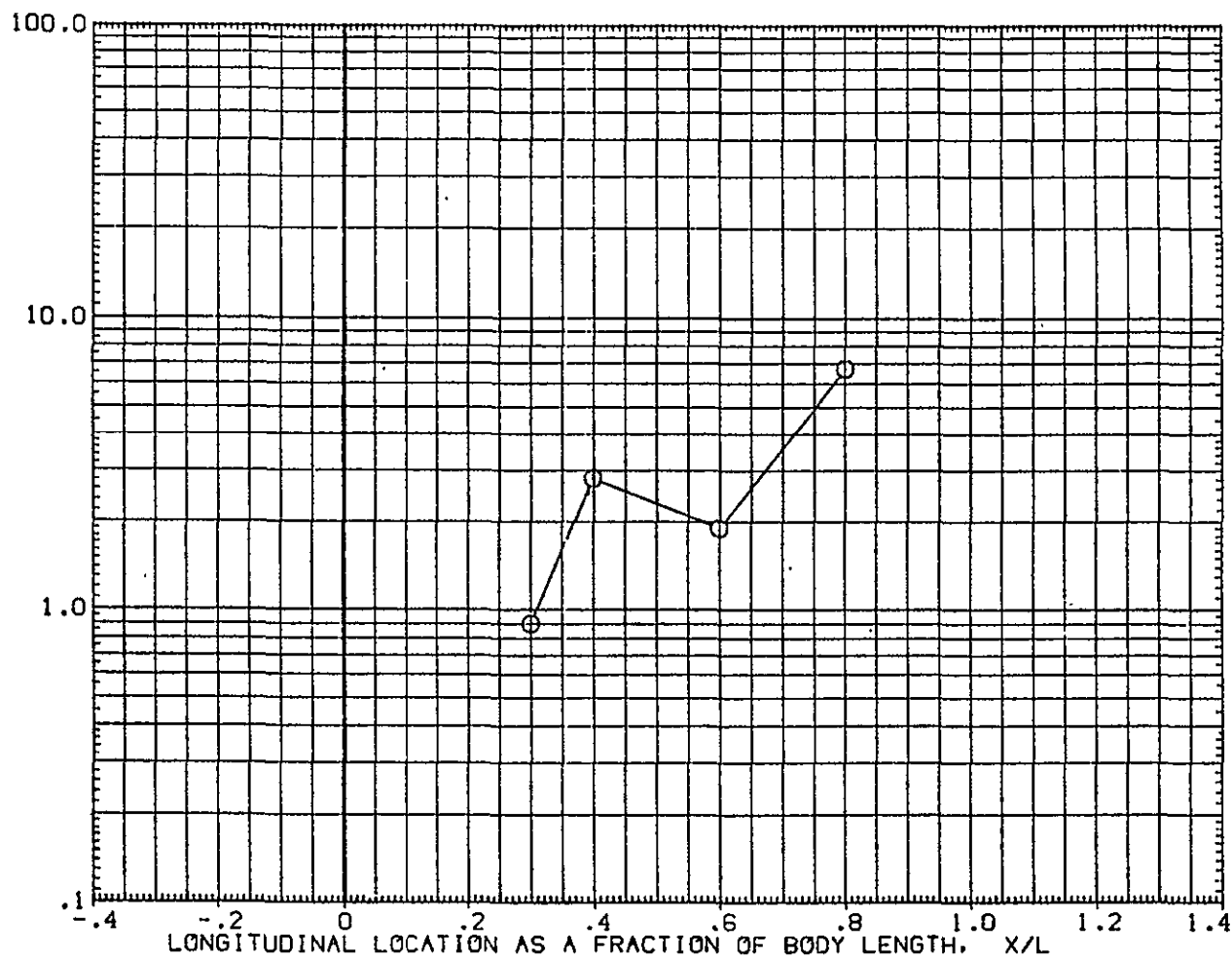


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/0(07) FUSELAGE (IUGB05)

SYMBOL
O
HAW/HT .900
PHI 30.000
MACH 7.610

PARAMETRIC VALUES
ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

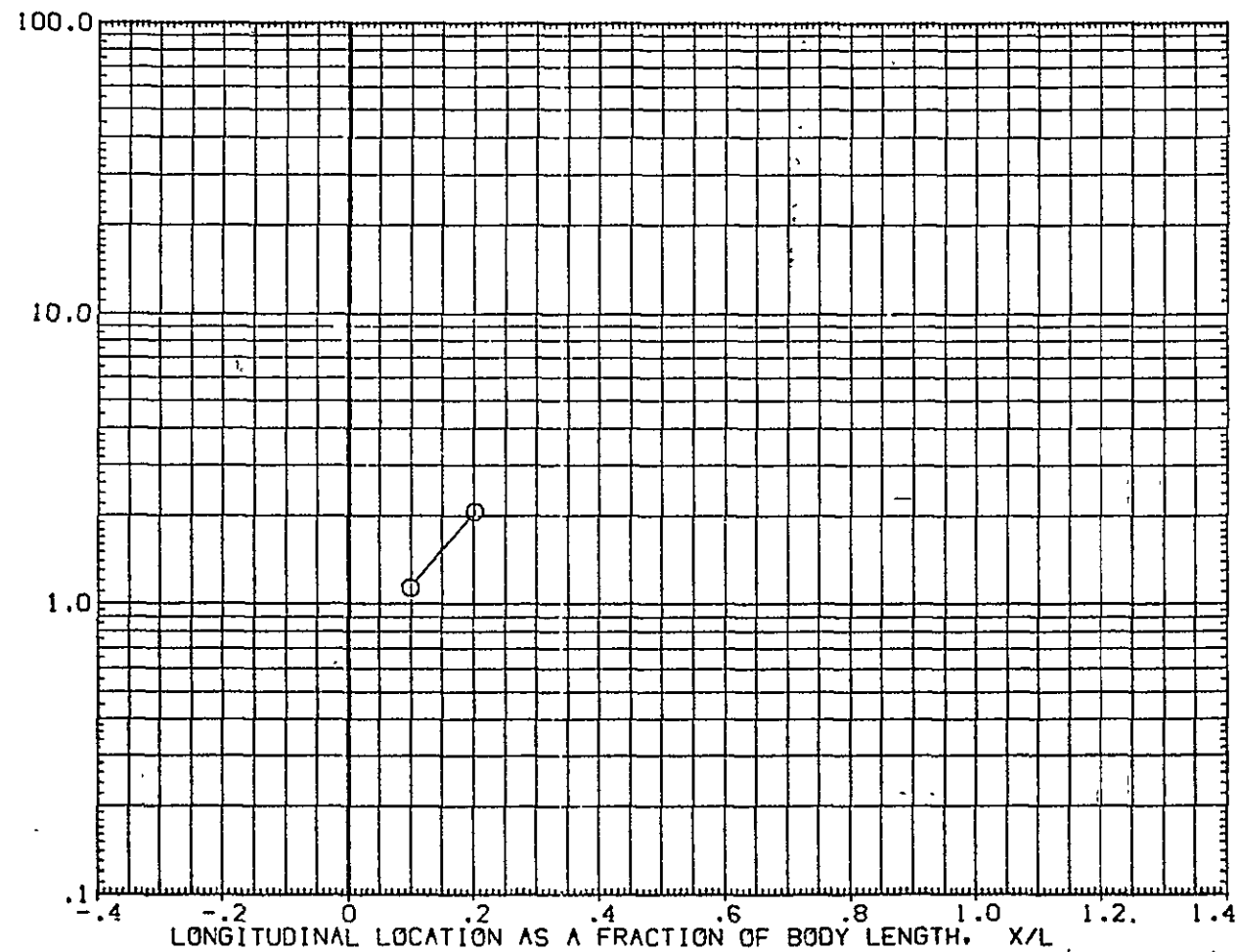


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/0(07) FUSELAGE (IUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.900	180.000	7.610	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

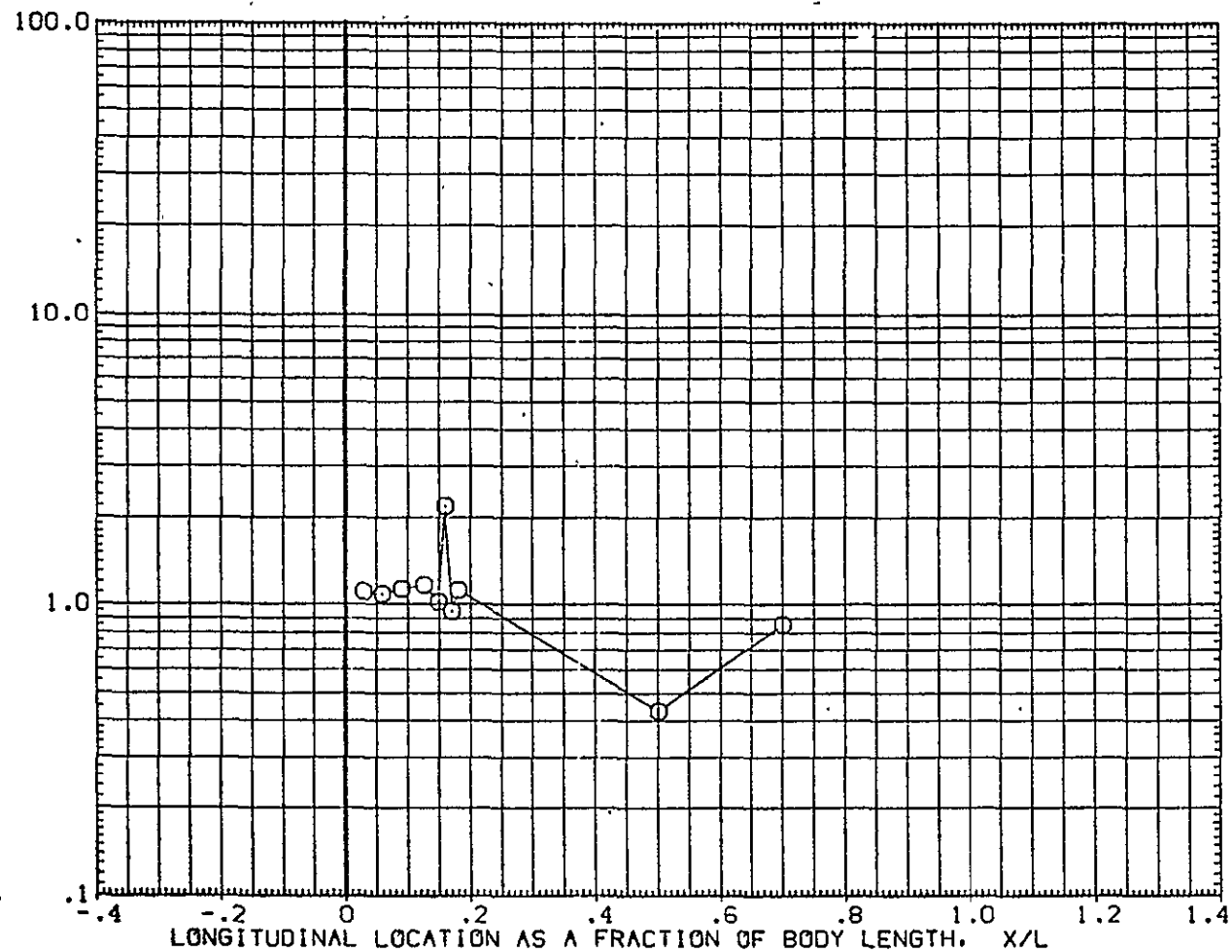


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

OH12 + IH21 MODEL 37 OT(05)/O(07) FUSELAGE (IUGB05)

SYMBOL	HAY/HT	PHI	MACH	PARAMETRIC VALUES		
O	.900	.000	18.300	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

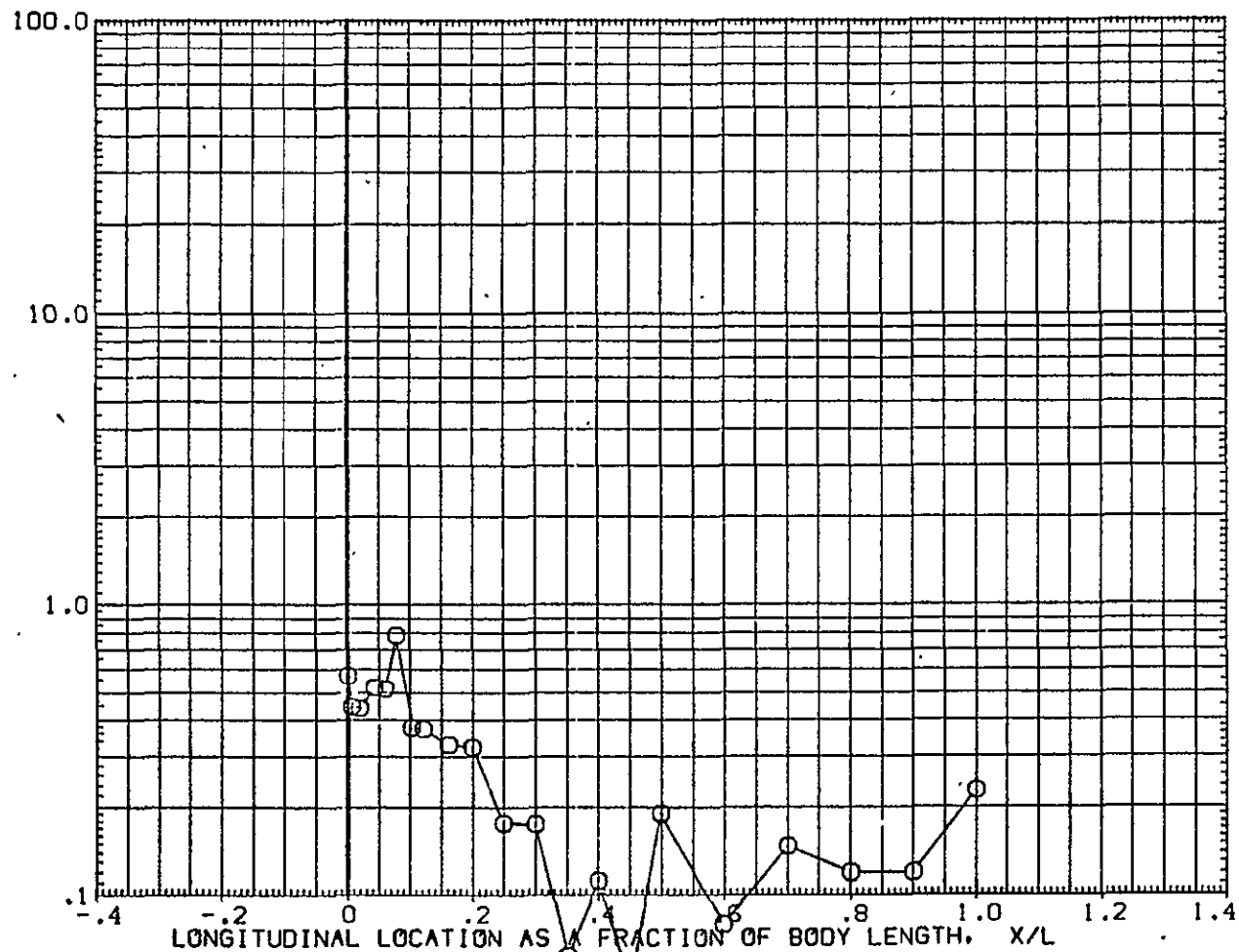


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 0T(05)/0(07) FUSELAGE (IUG805)

SYMBOL
O

HAW/HT
.900

PHI
25.000

MACH
18.300

PARAMETRIC VALUES

ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

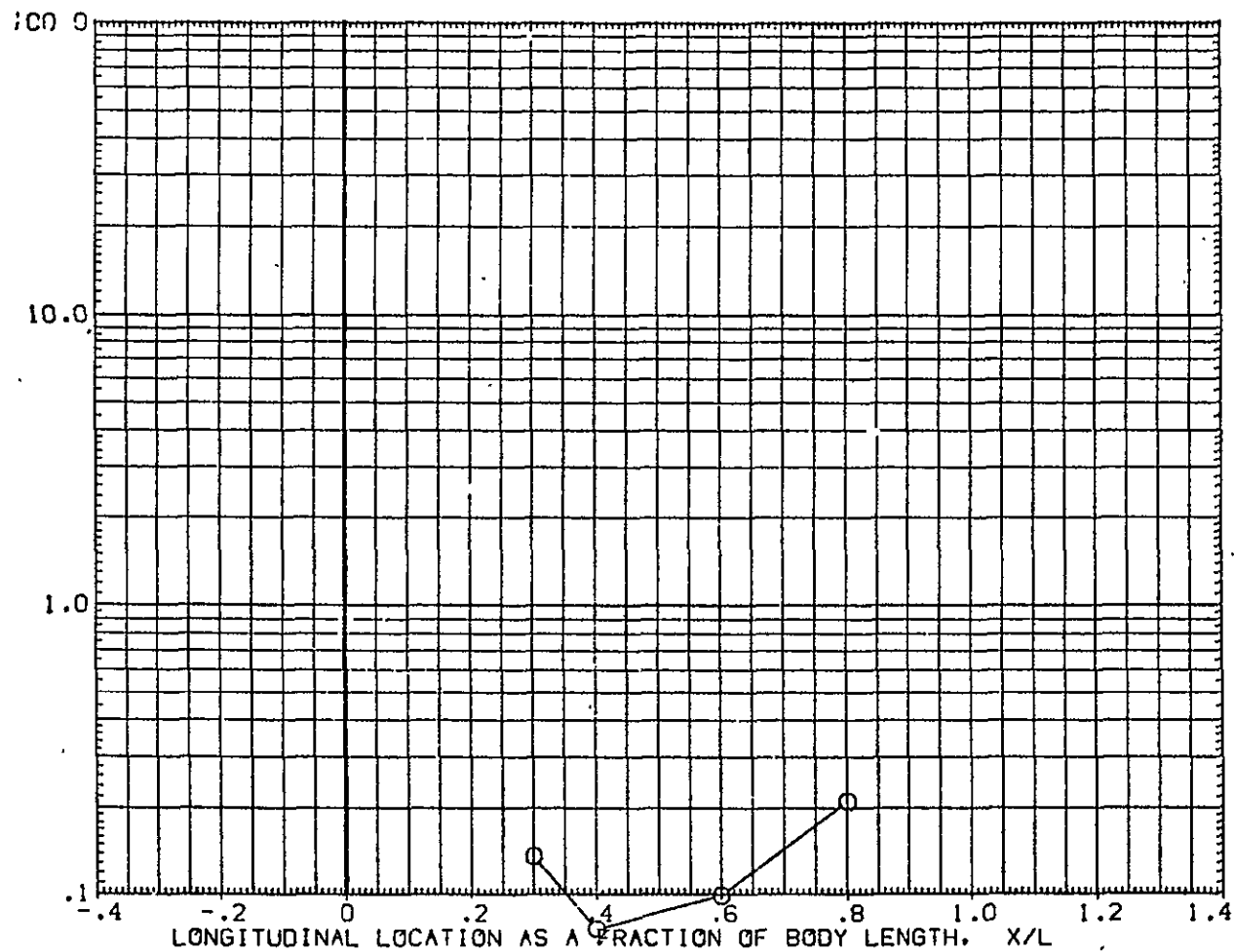


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 0T(05)/0(07) FUSELAGE (IUGB05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA
○	.900	30.000	18.300	.000	.000	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

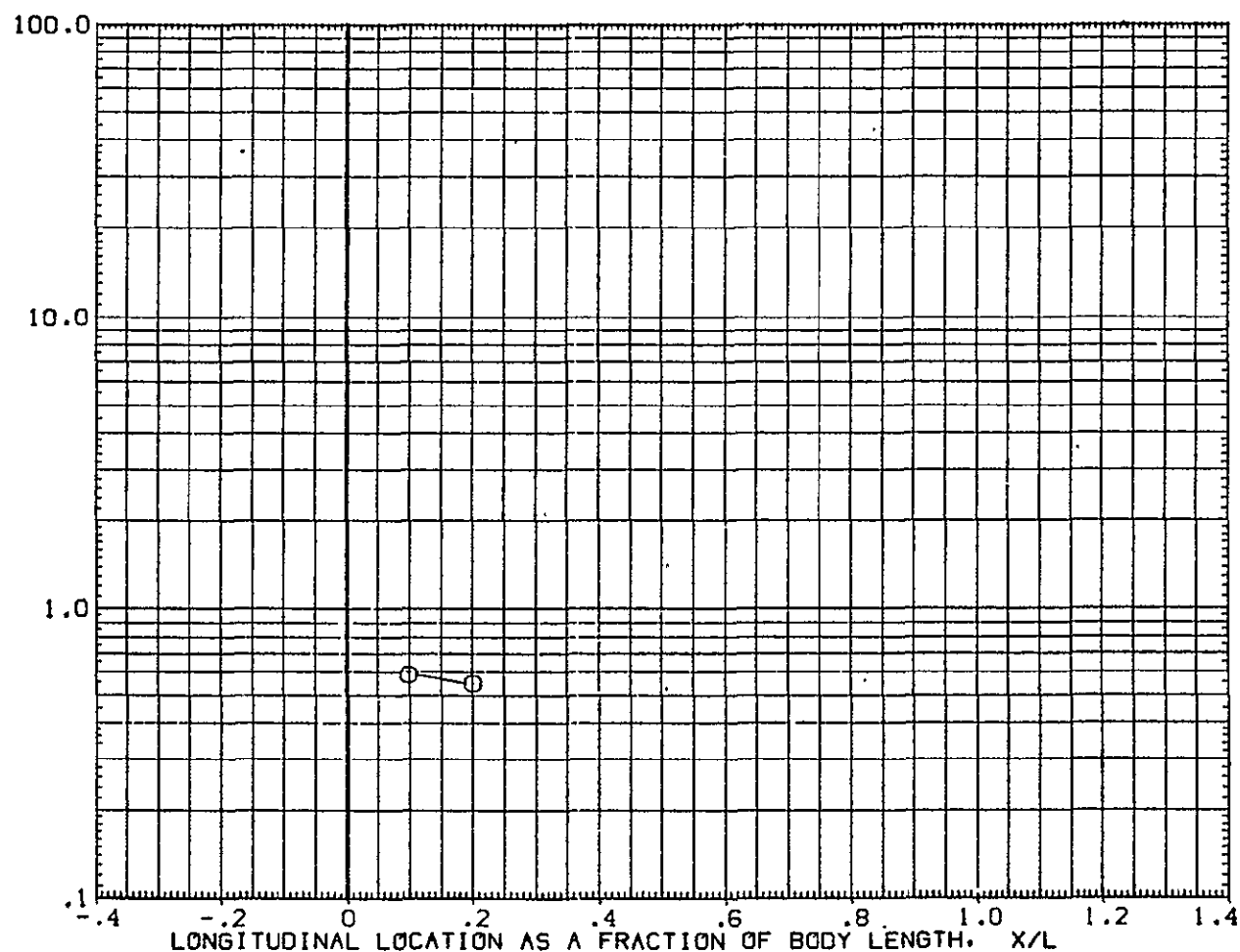


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 0T(05)/0(07) FUSELAGE (IUGB05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.900	180.000	18.300	.000	BETA	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

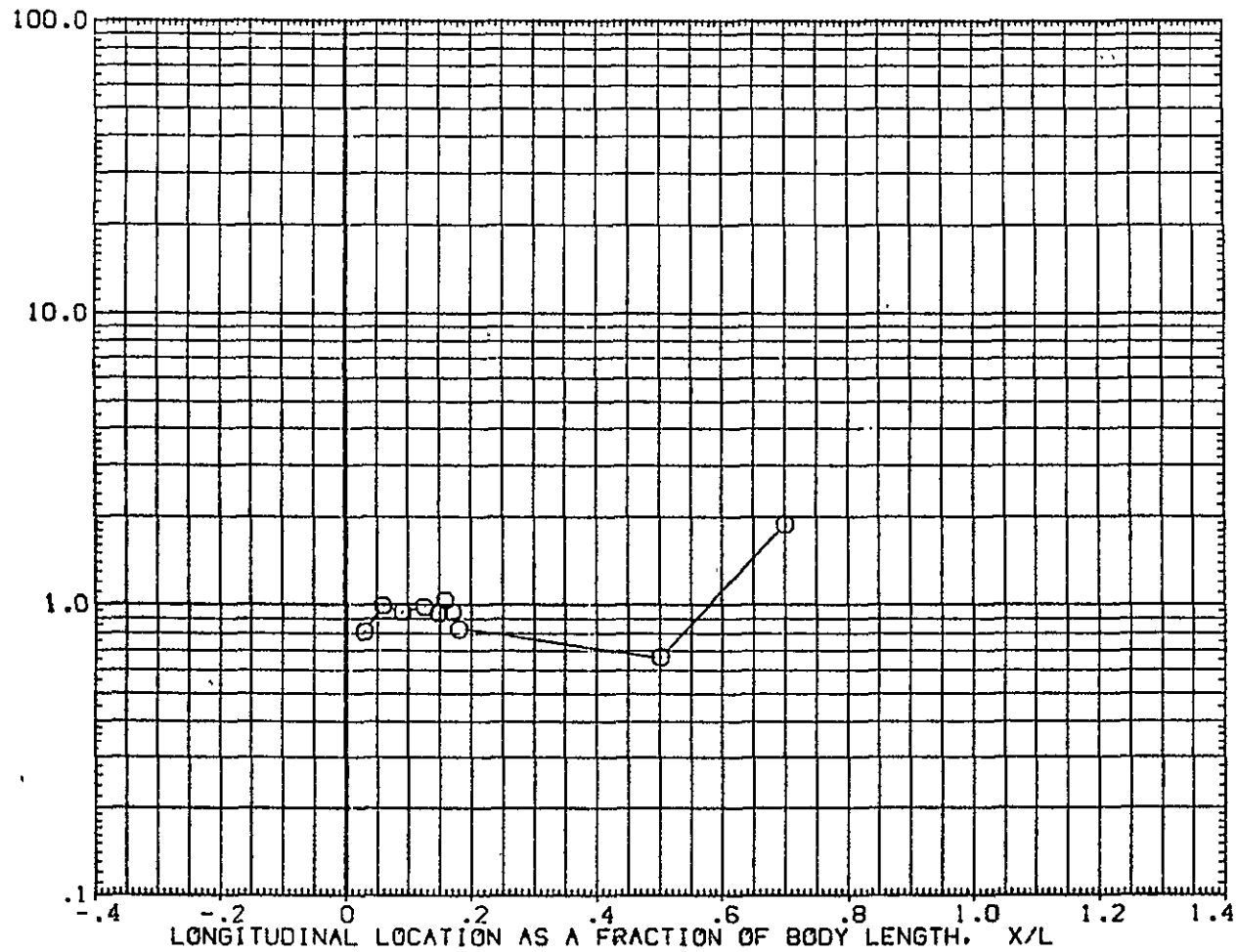


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/O(07) FUSELAGE (IUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES			
O	.900	.000	19.180	ALPHA	.000	BETA	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

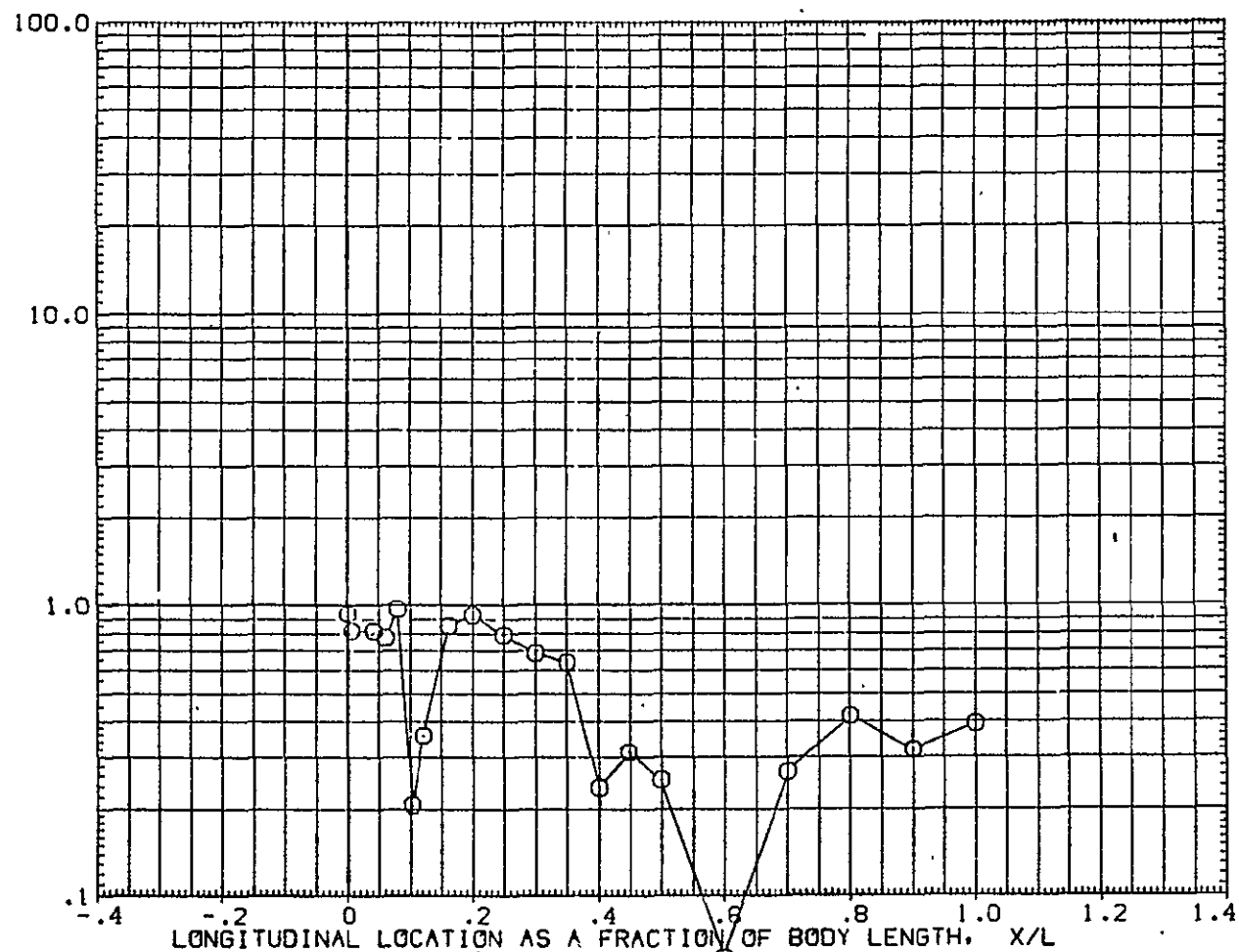


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 0T(05)/0(07) FUSELAGE (IUGB05)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.900	25.000	19.180		.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

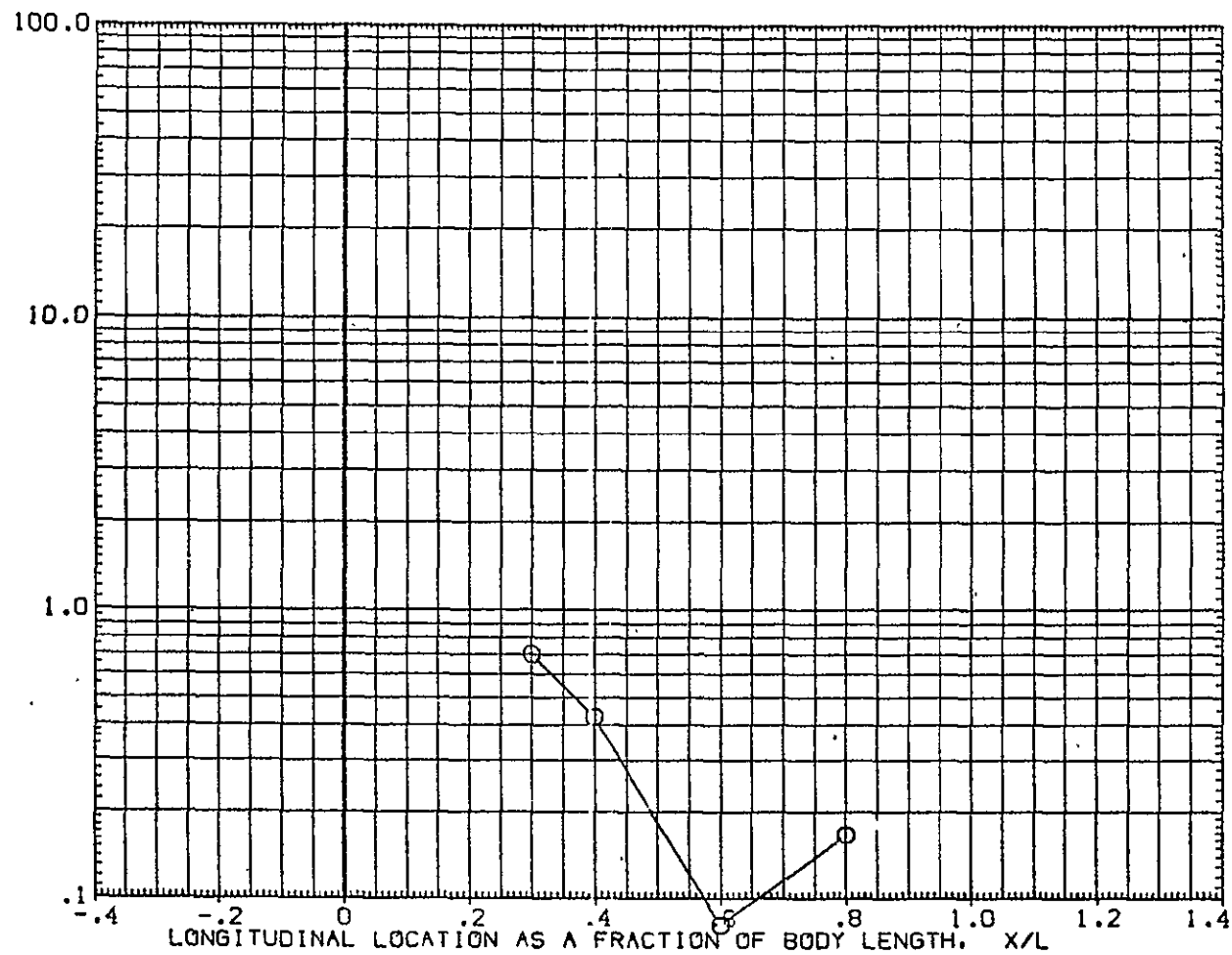


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/0(07) FUSELAGE (IUGB05)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.900	30.000	19.180	ALPHA	.000	BETA
						.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

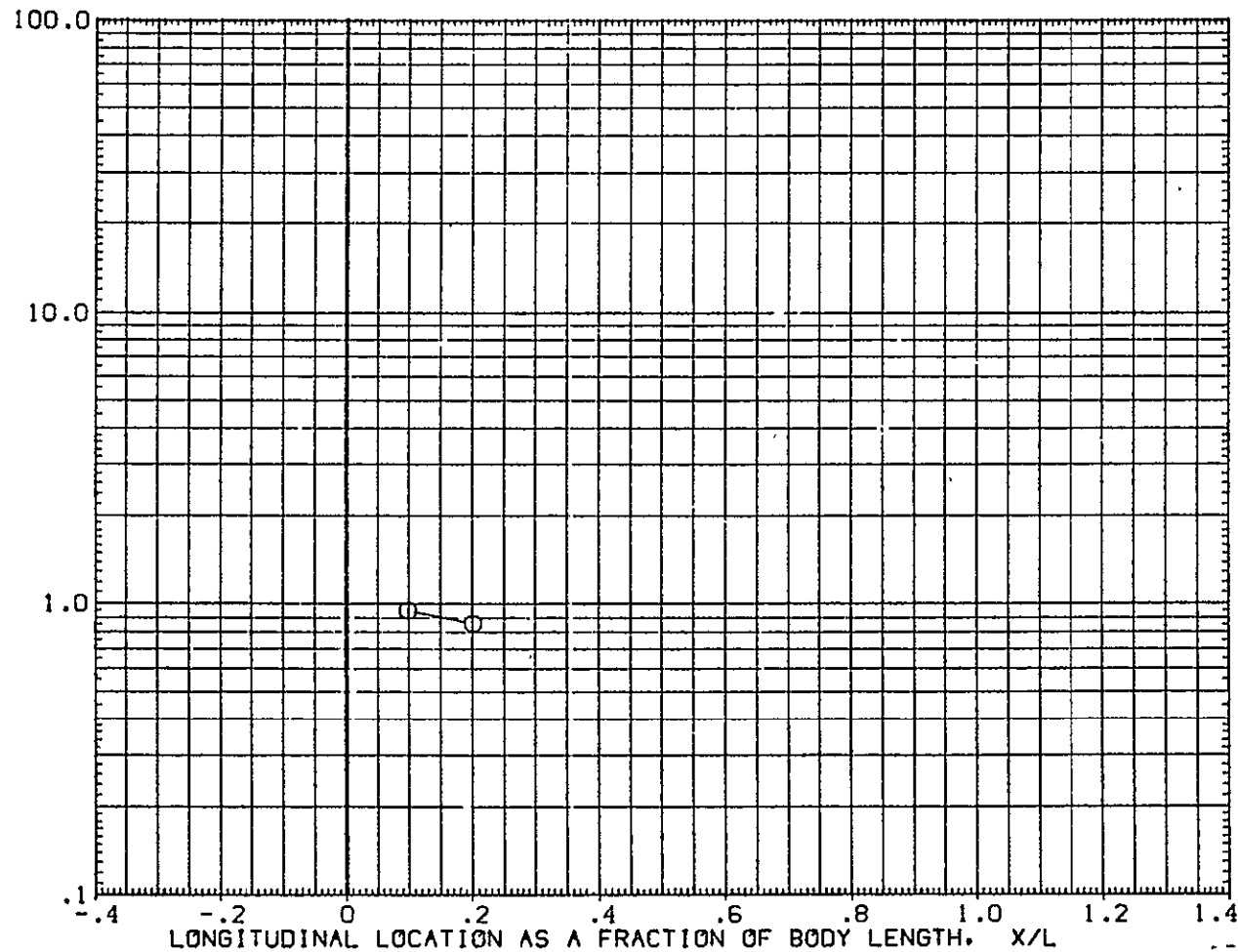


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

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ORIGINAL PAGE IS POOR

C-5

OH12 + IH21 MODEL 37 OT(05)/O(07) FUSELAGE (IUGB05)

SYMBOL	RAV/HT	PHI	MACH	PARAMETRIC VALUES		
O	.900	180.000	19.180	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

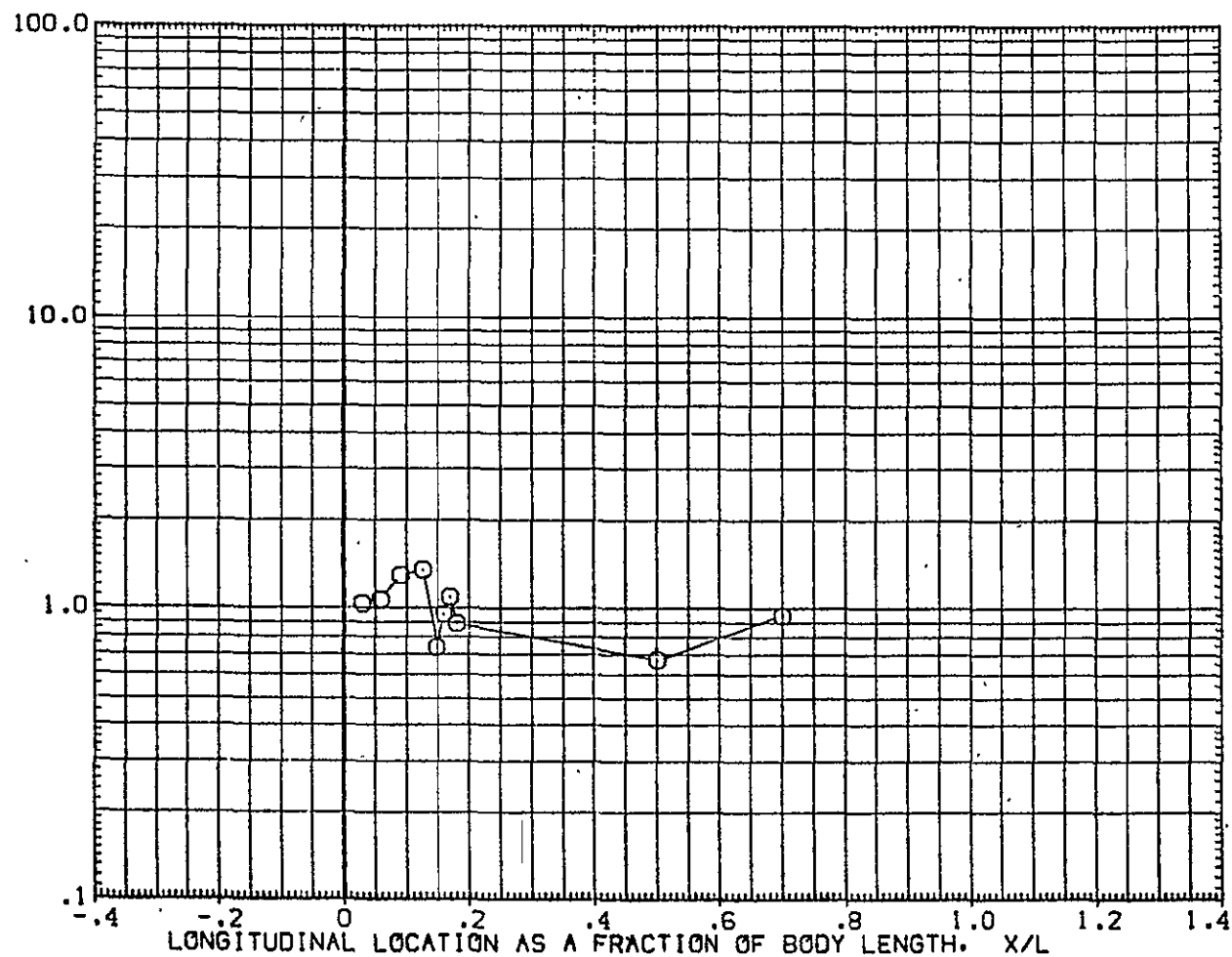


FIG. 8 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
□	.850	.250	6.997	ALPHA	.000	BETA
◇	.900					.000
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

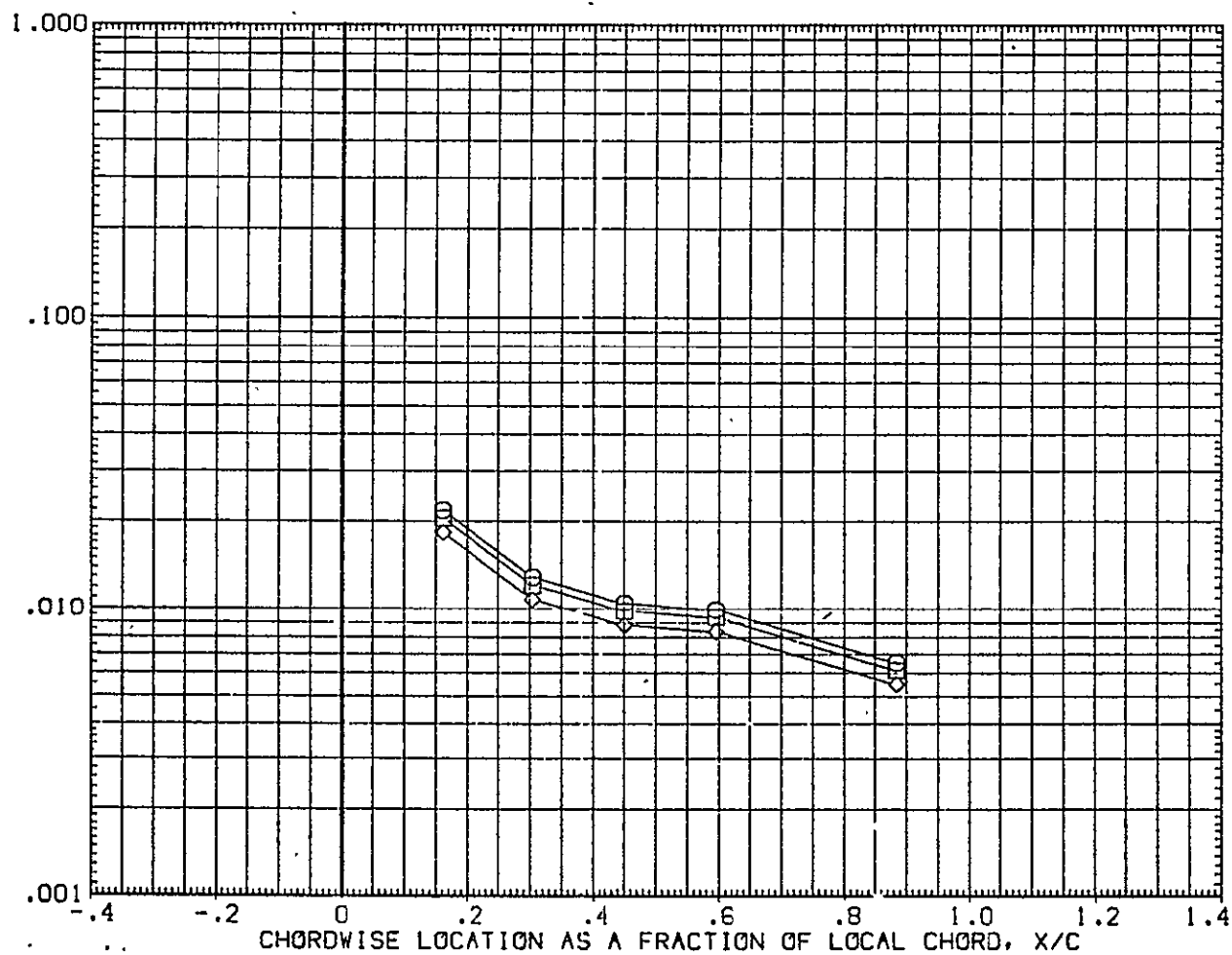


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0^\circ$

0H12/1H21 (CAL HST 173-100) 37 0

WING L.S. (RUGW07)

SYMBOL	HAW/HT	ZY/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	.400	6.997	.000		.000
◇	.900					
◇	1.000					

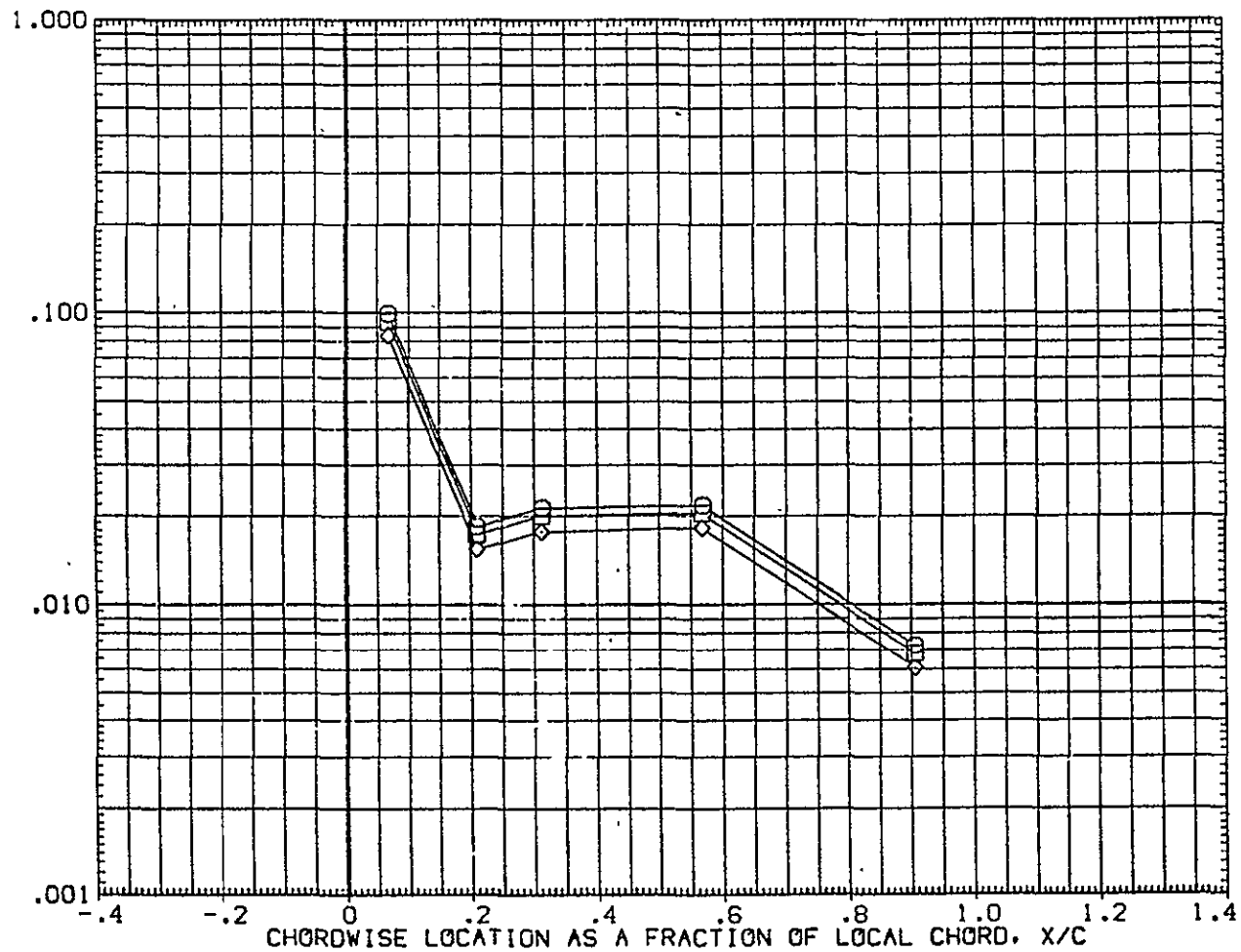
RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF} 

FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER · ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37°0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES
◇	.850	.500	6.997	ALPHA .000 BETA .000
□	.900			
◇	1.000			

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

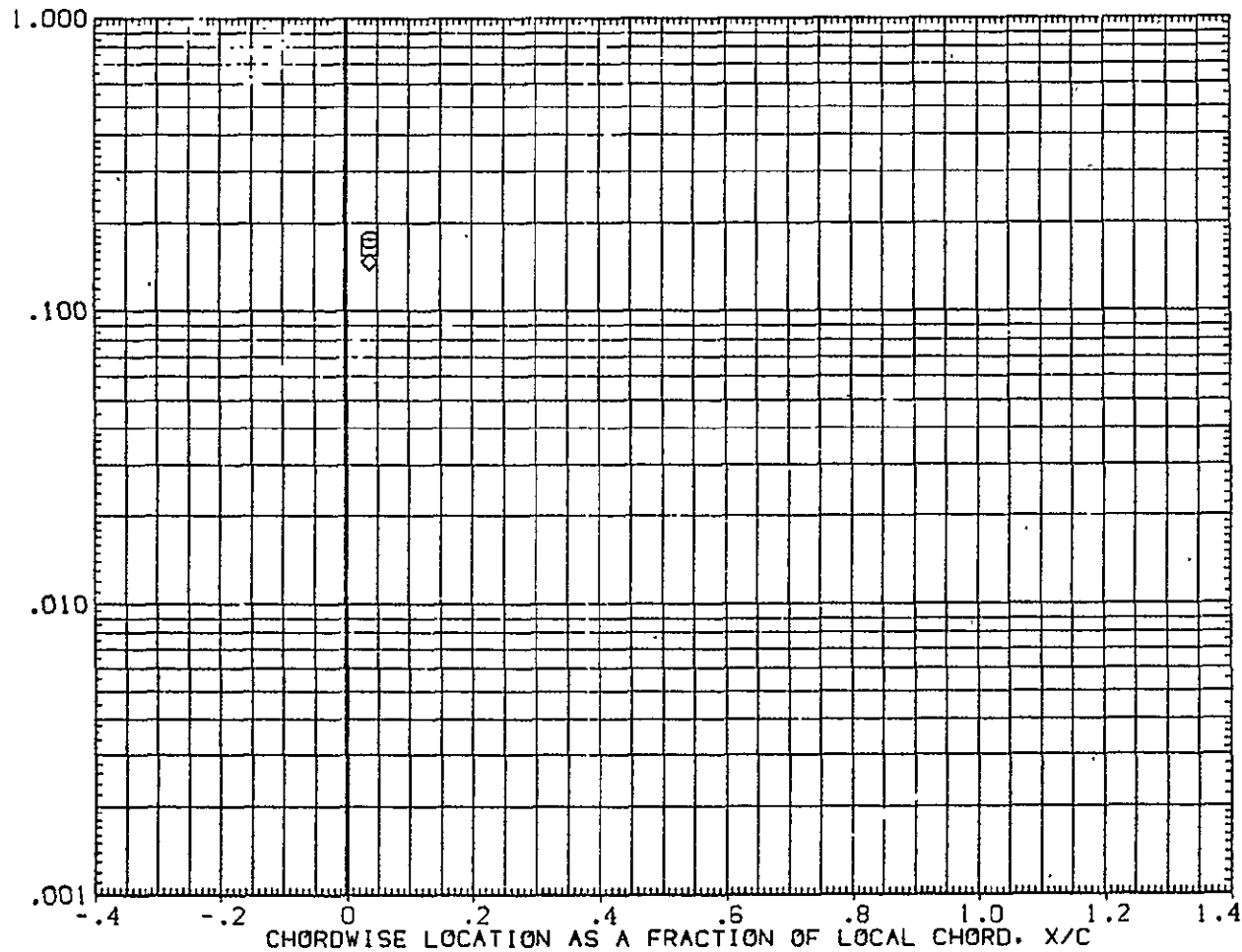
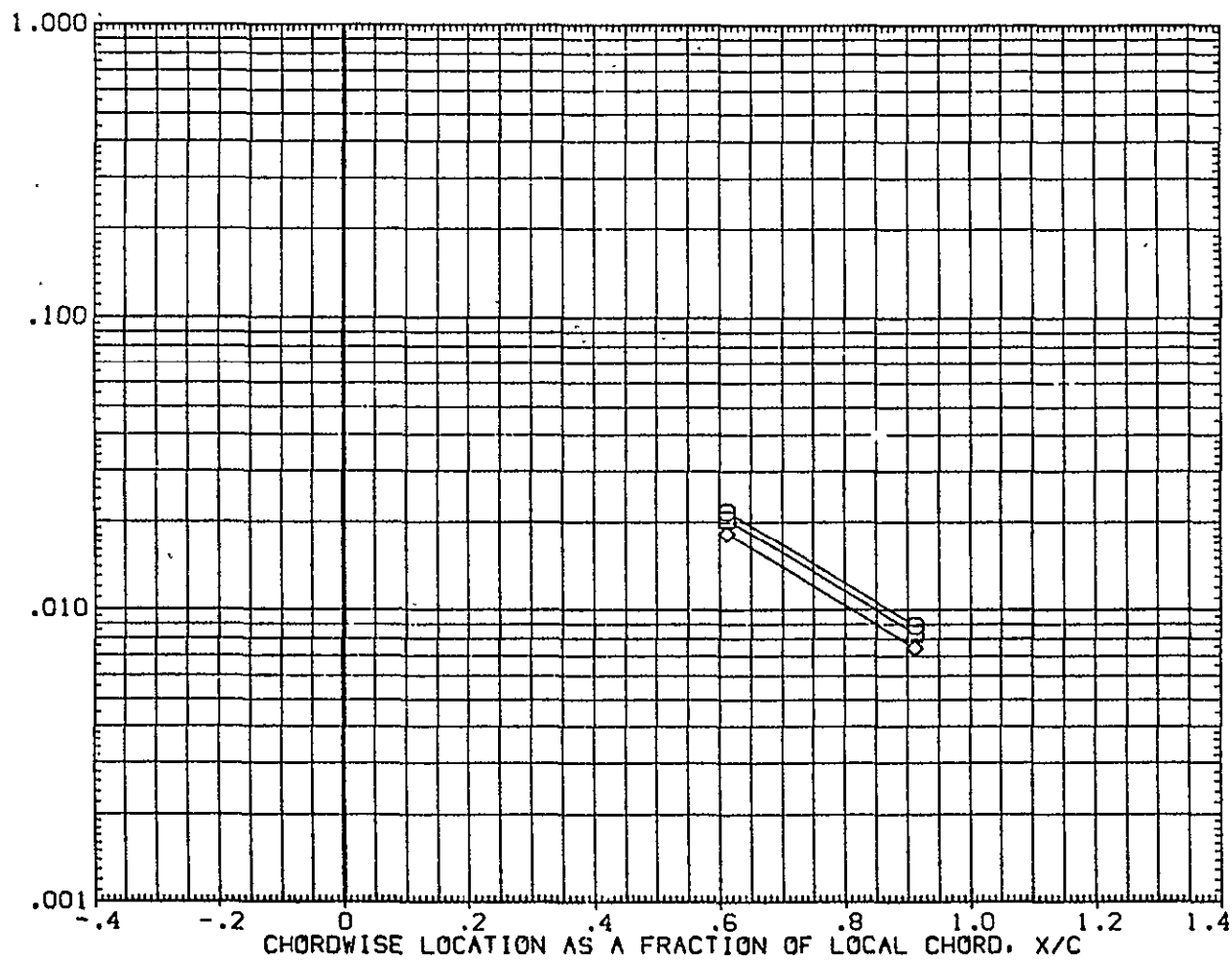


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	2Y/B	MACH	ALPHA	PARAMETRIC VALUES	BETA	
◇	.850	.600	6.997	.000			.000
□	.900						
○	1.000						

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12/1H21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/PT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	.750	6.997	.000	.000	.000
◇	.900					
	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

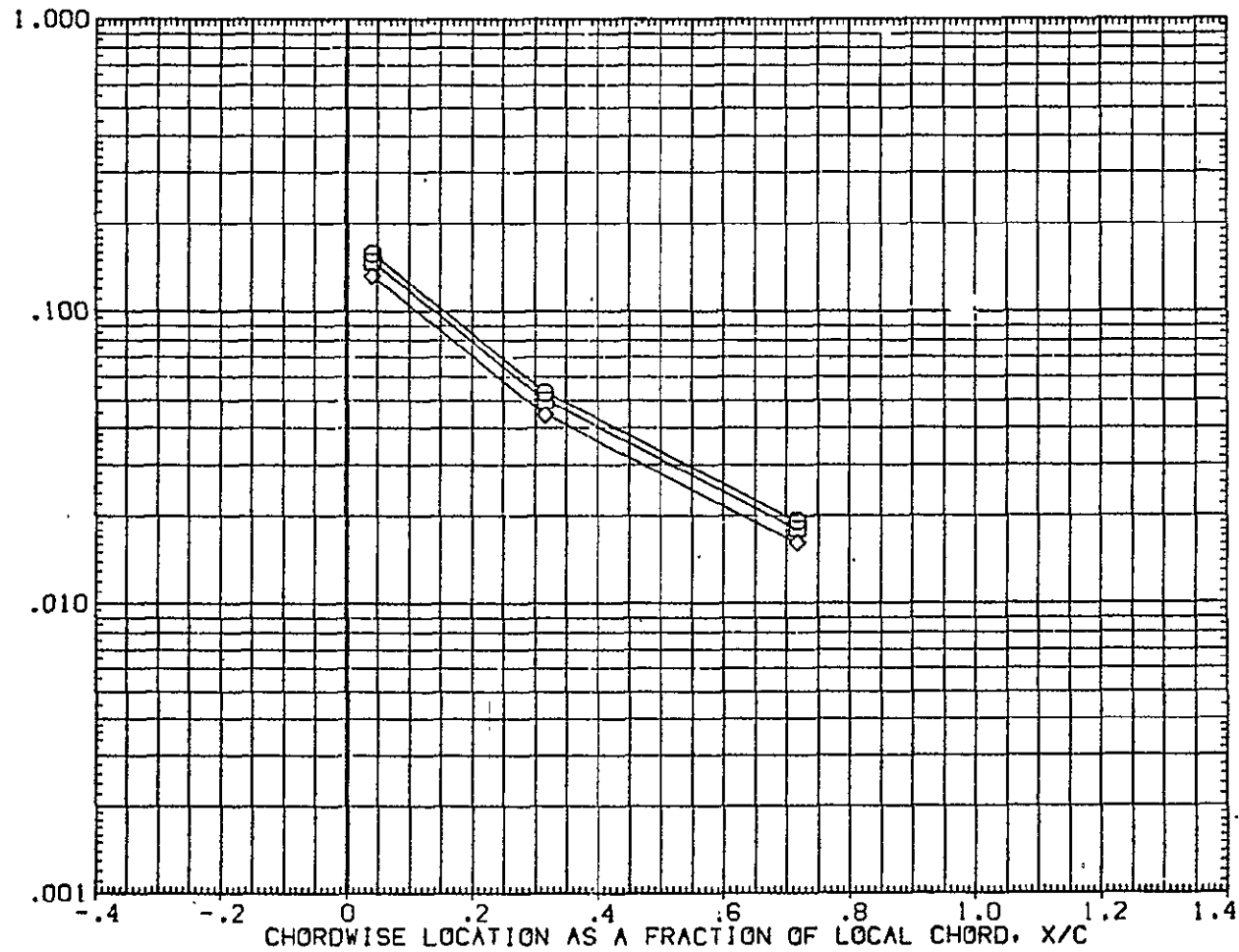
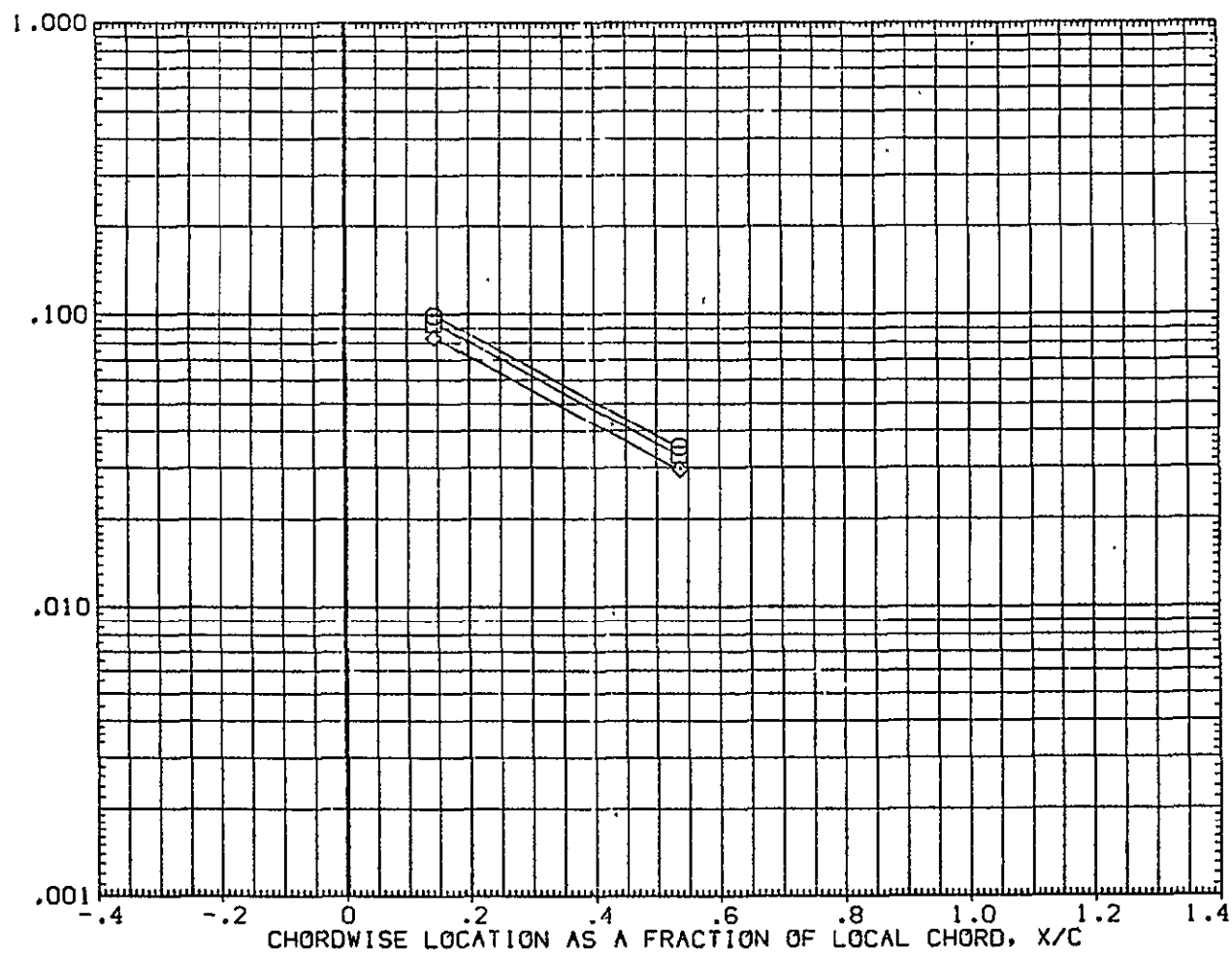


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	.950	6.997	.000		.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

CH12/1H21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	ZY/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	.250	7.614	.000		.000
□	.900					
◇	1.000					

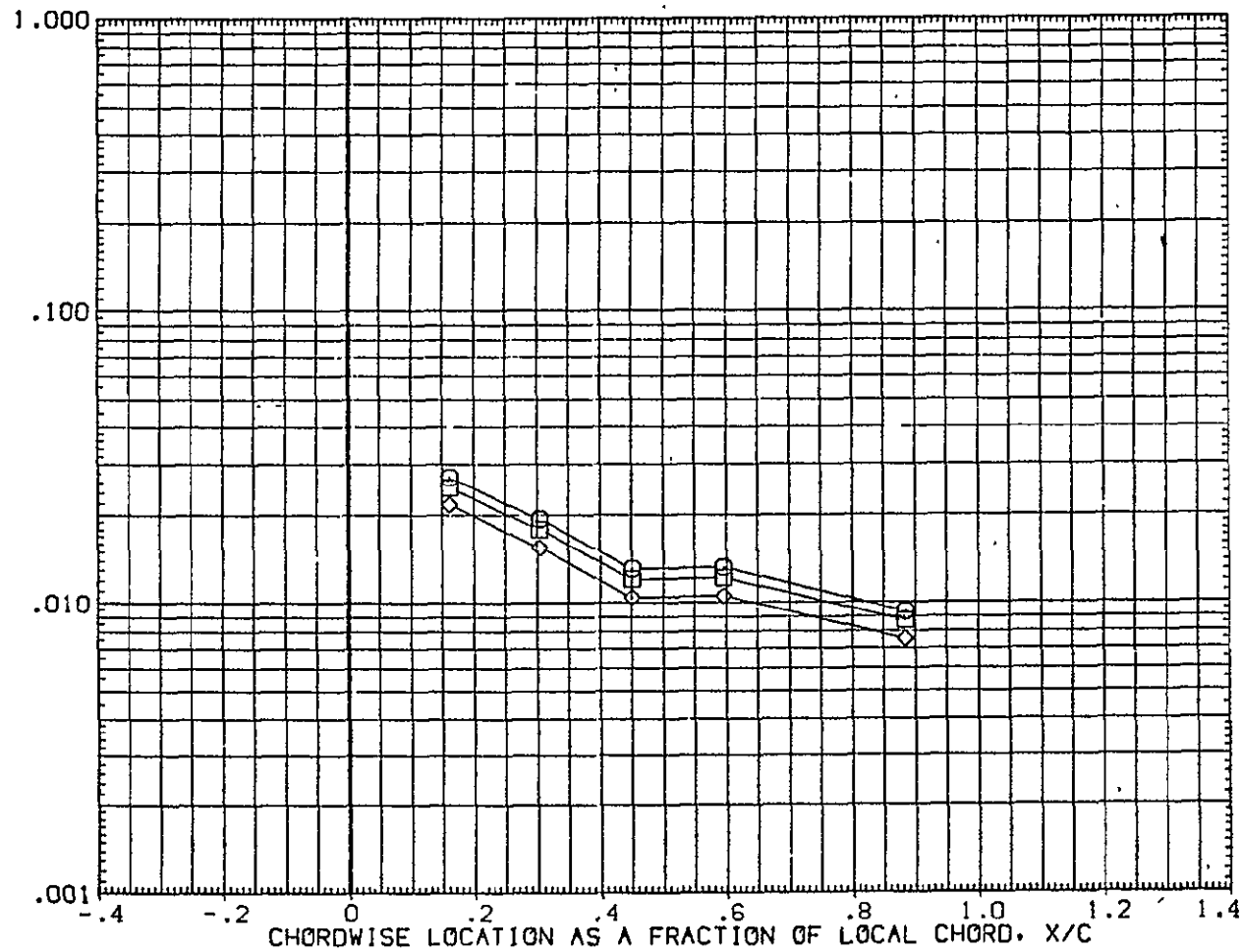
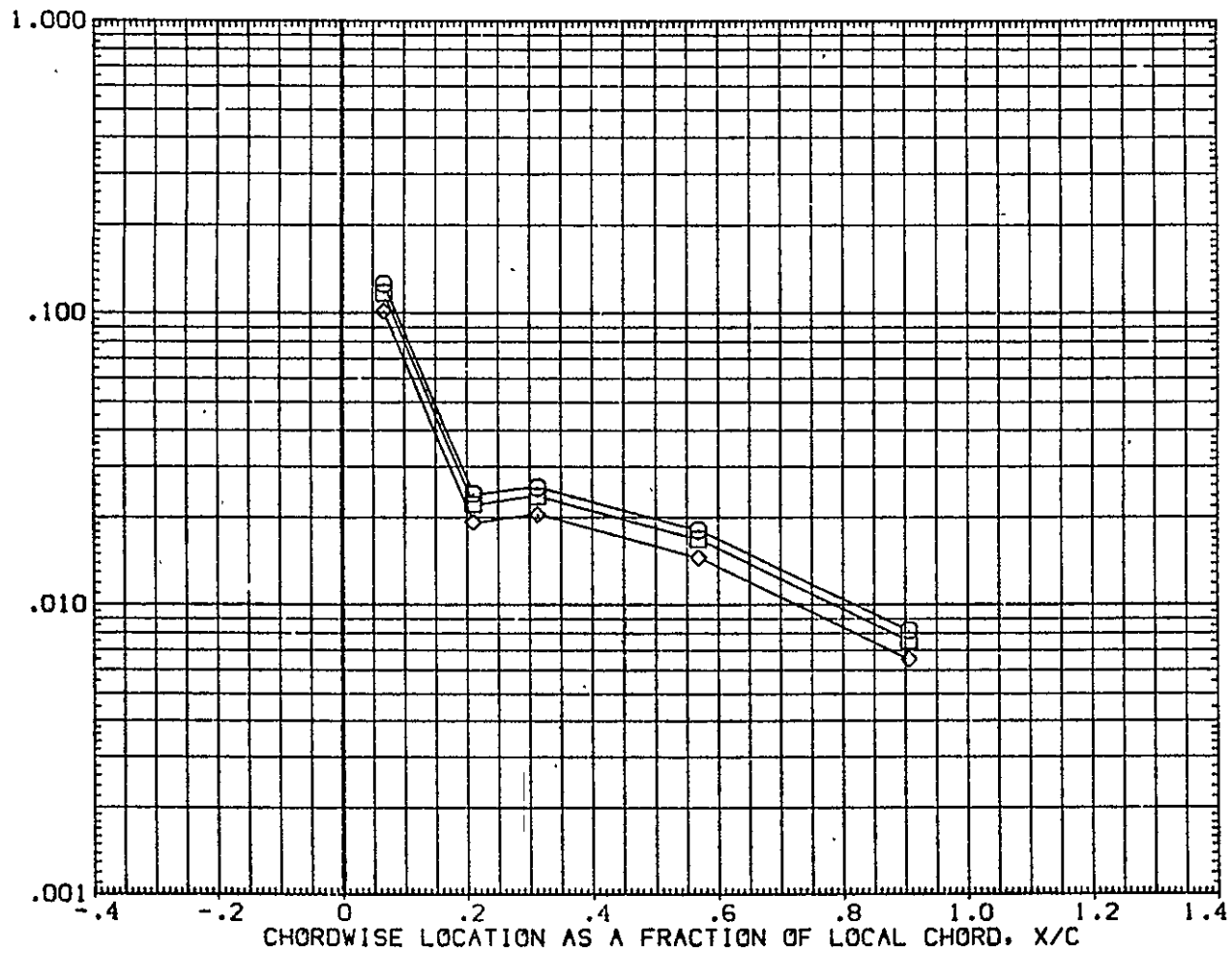
RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} 

FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

0H12/1H21 (CAL HST I73-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	.400	7.614	.000	.000	.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
○	.850	.500	7.614	ALPHA	.000	BETA
□	.900					.000
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

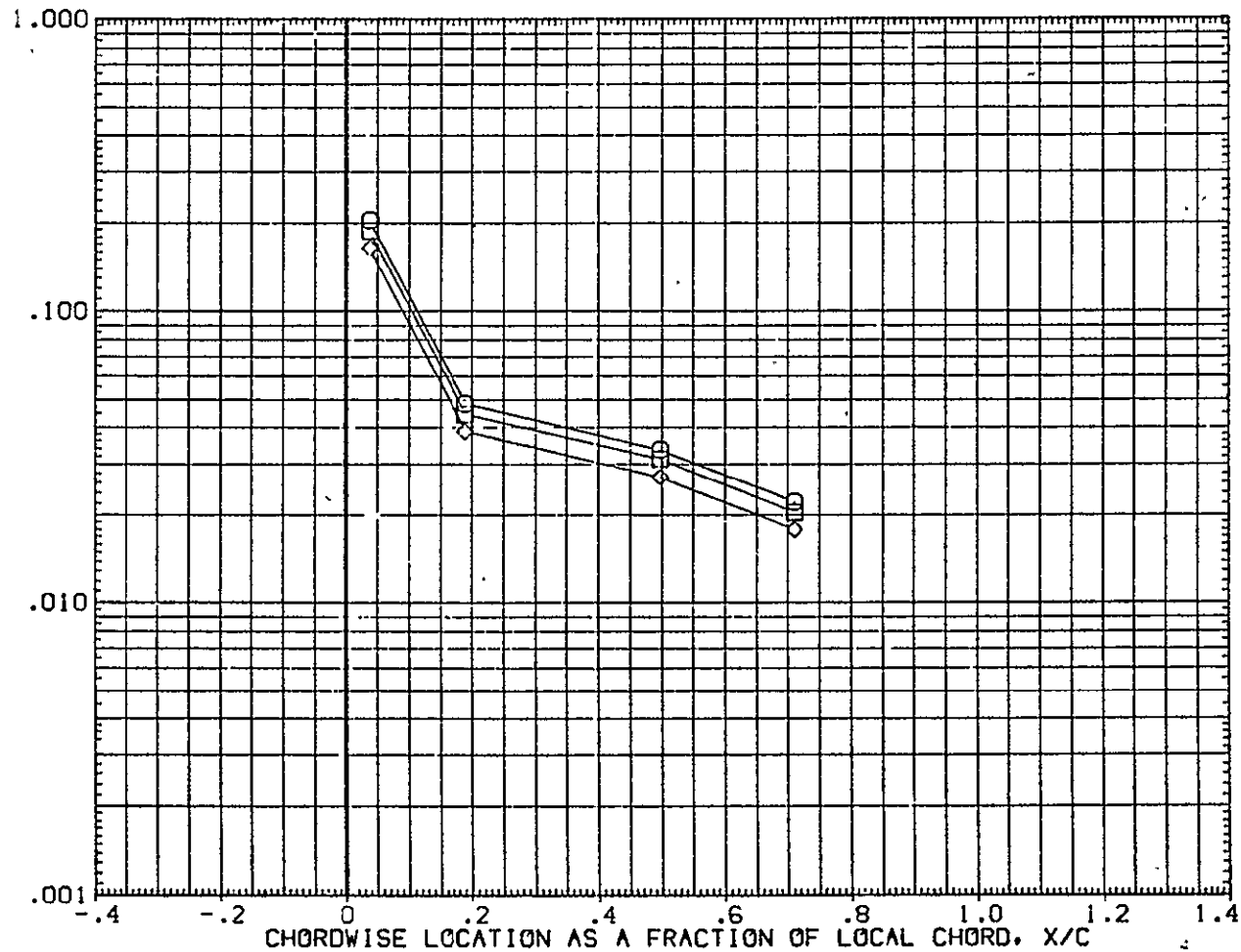


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	2Y/B	MACH
□	.850	.600	7.614
◇	.900		
◇	1.000		

PARAMETRIC VALUES	
ALPHA	BETA
.000	.000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

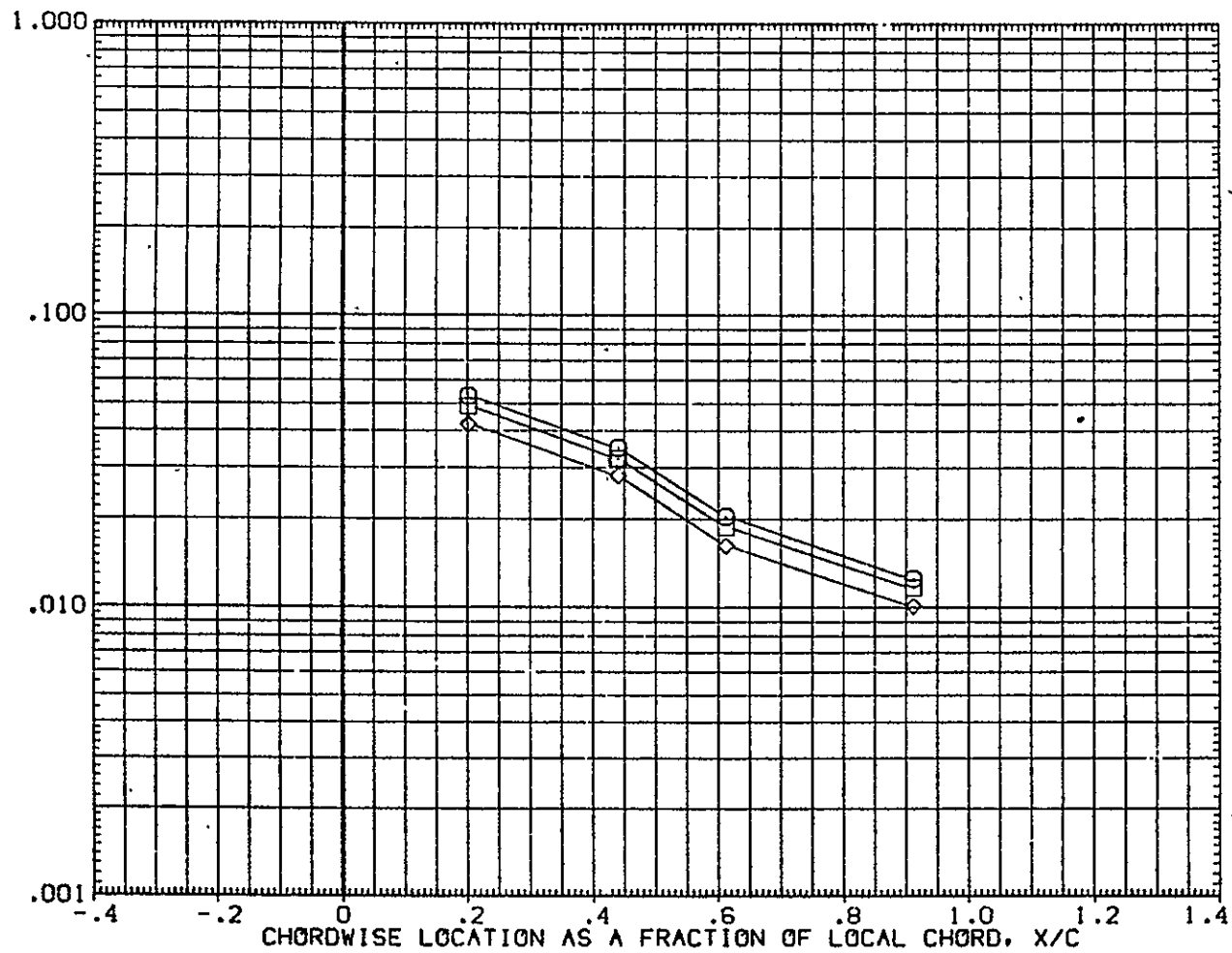


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

CH12/IH21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	ZY/B	MACH	PARAMETRIC VALUES		
◇	.850	.750	7.614	ALPHA	.000	BETA .000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT. H/HREF

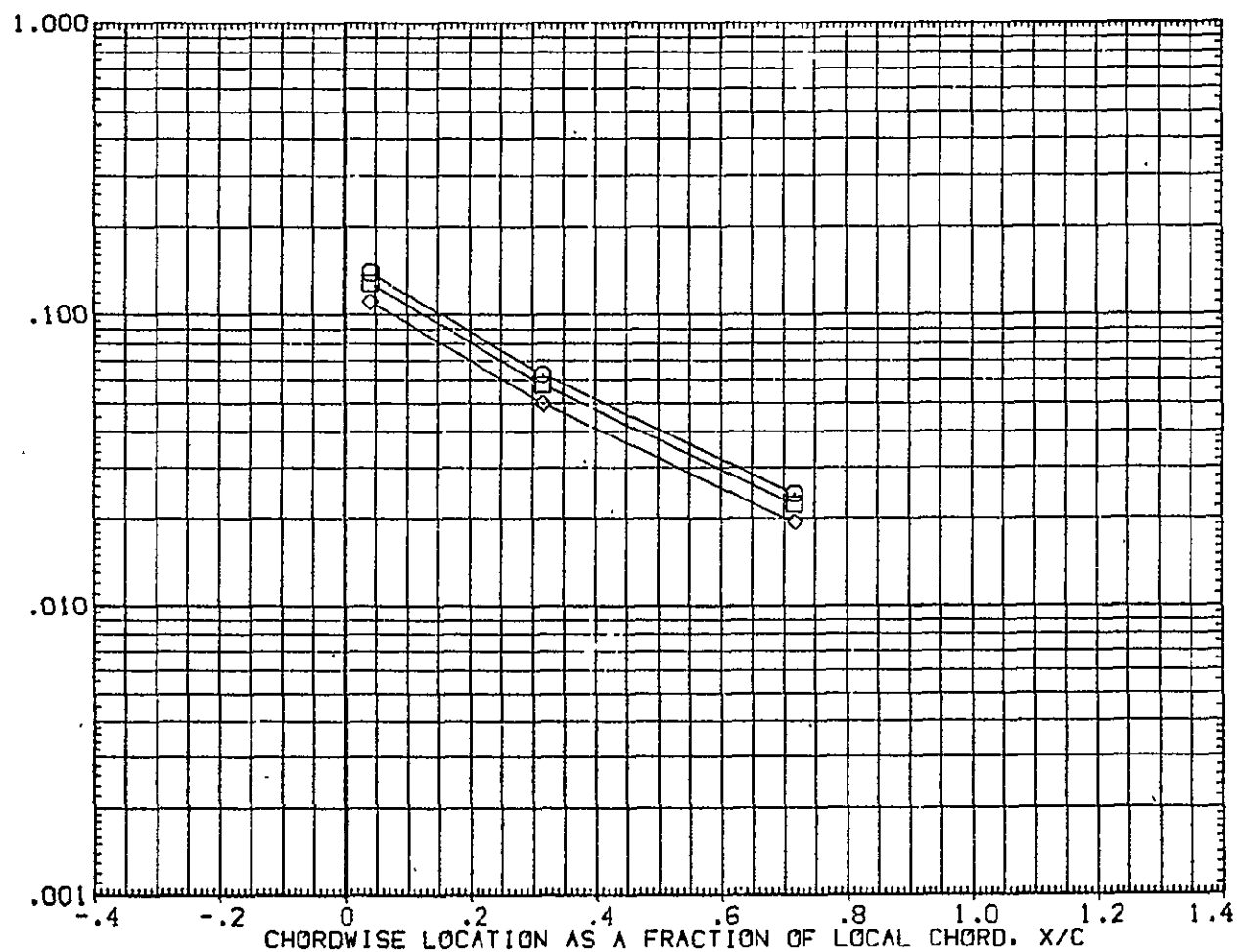


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
○	.850	.950	7.614	ALPHA	.000	BETA
◇	1.000					.000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

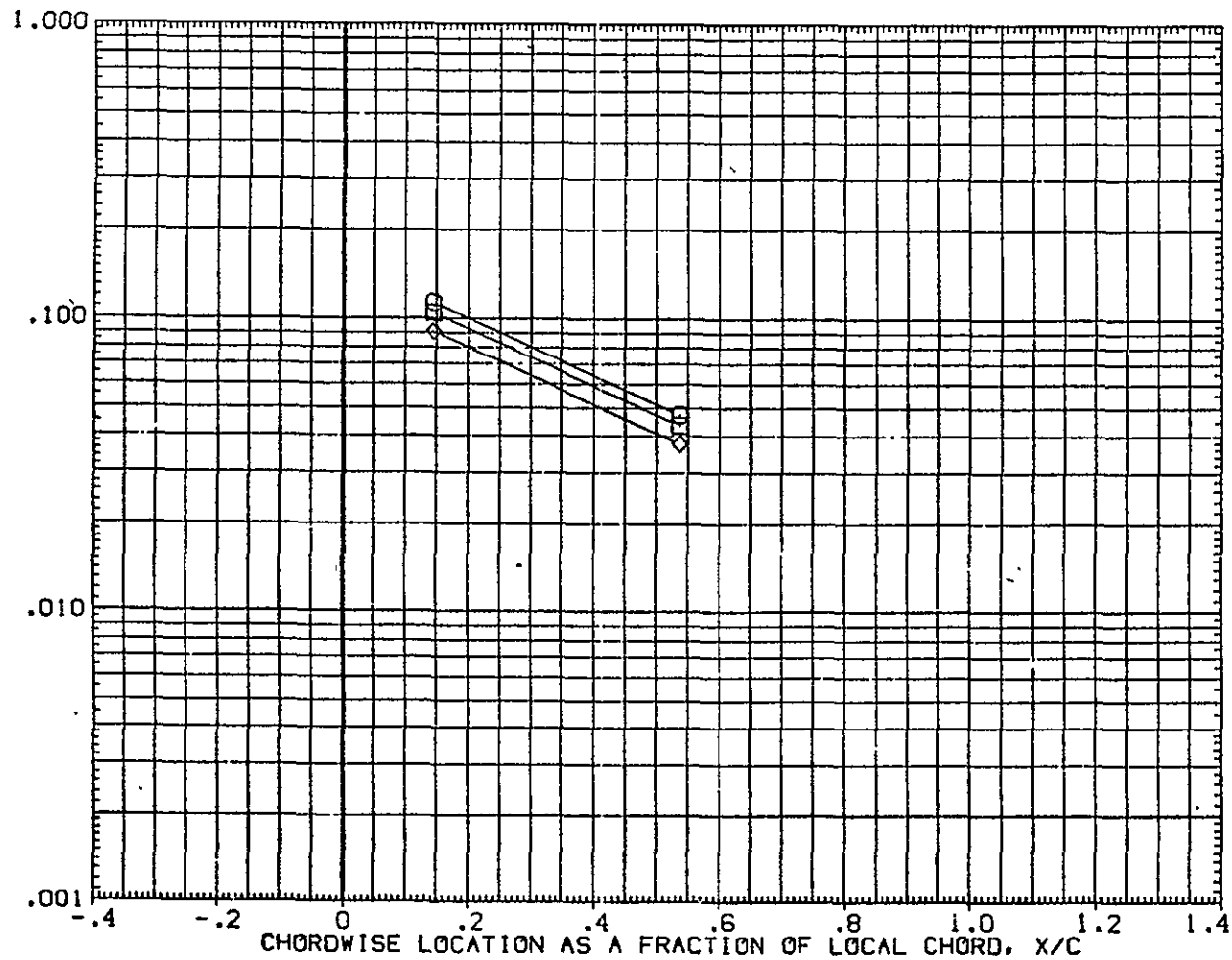


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0

WING L.S. (RUGW07)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	.250	16.060	.000		
◇	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

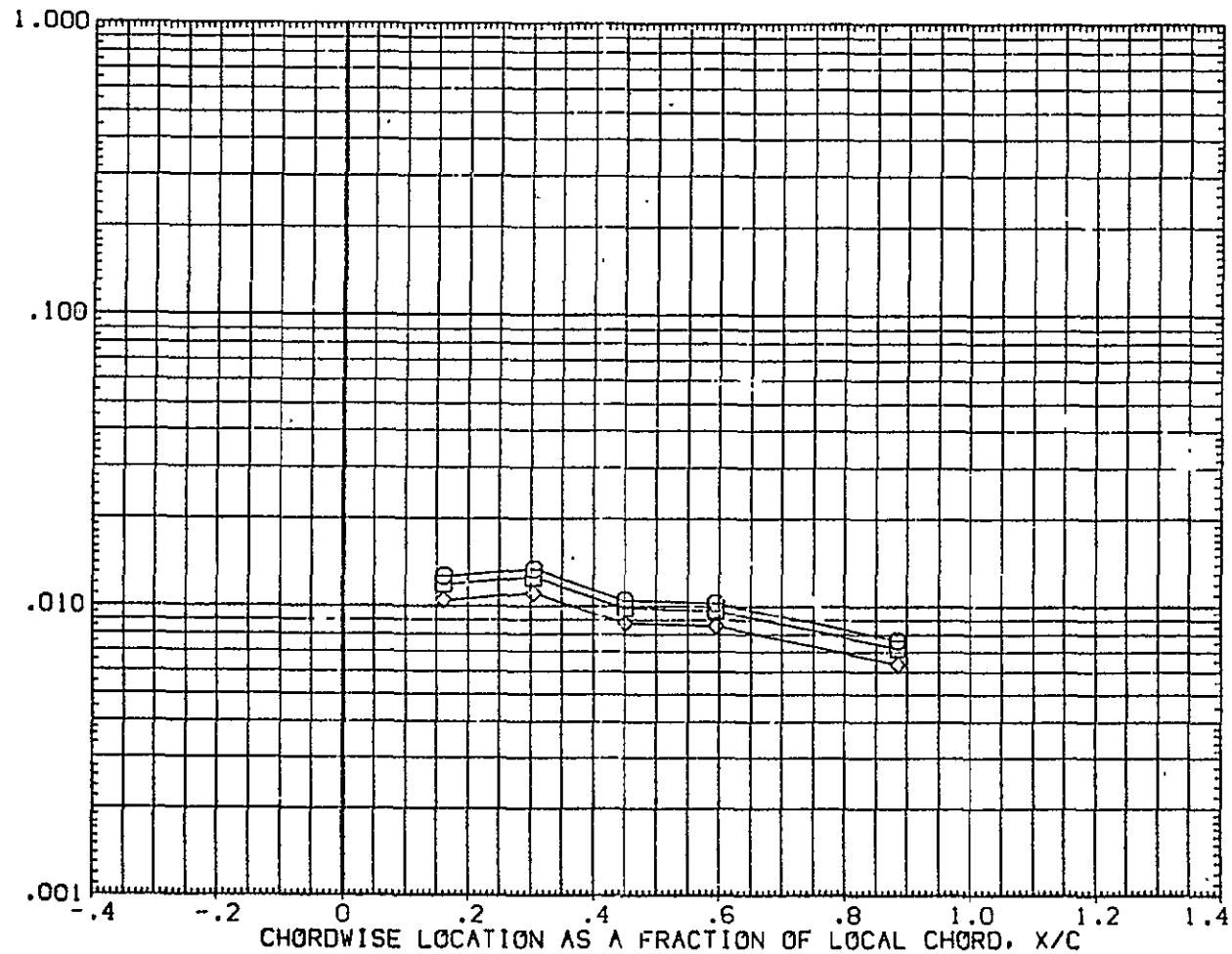
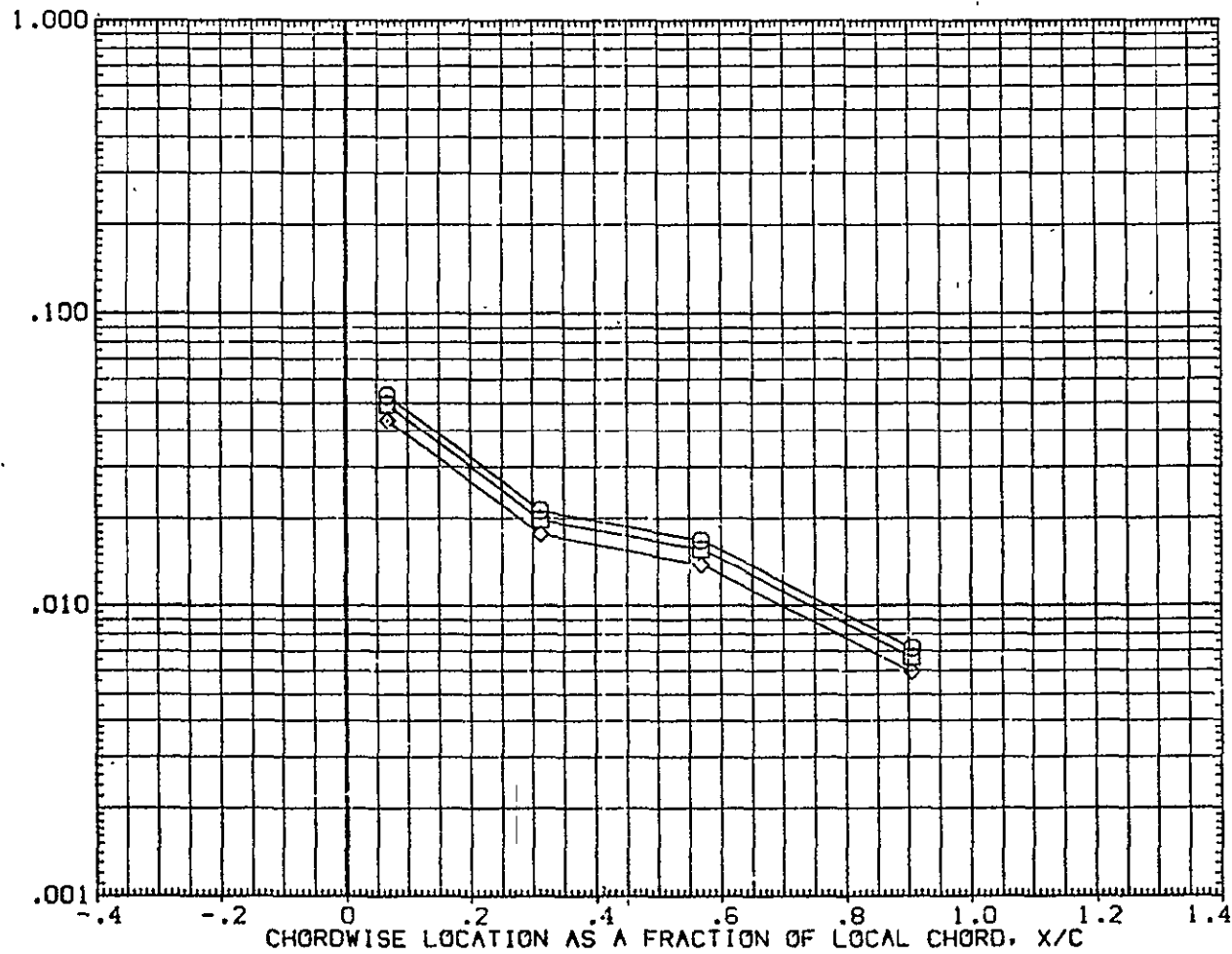


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

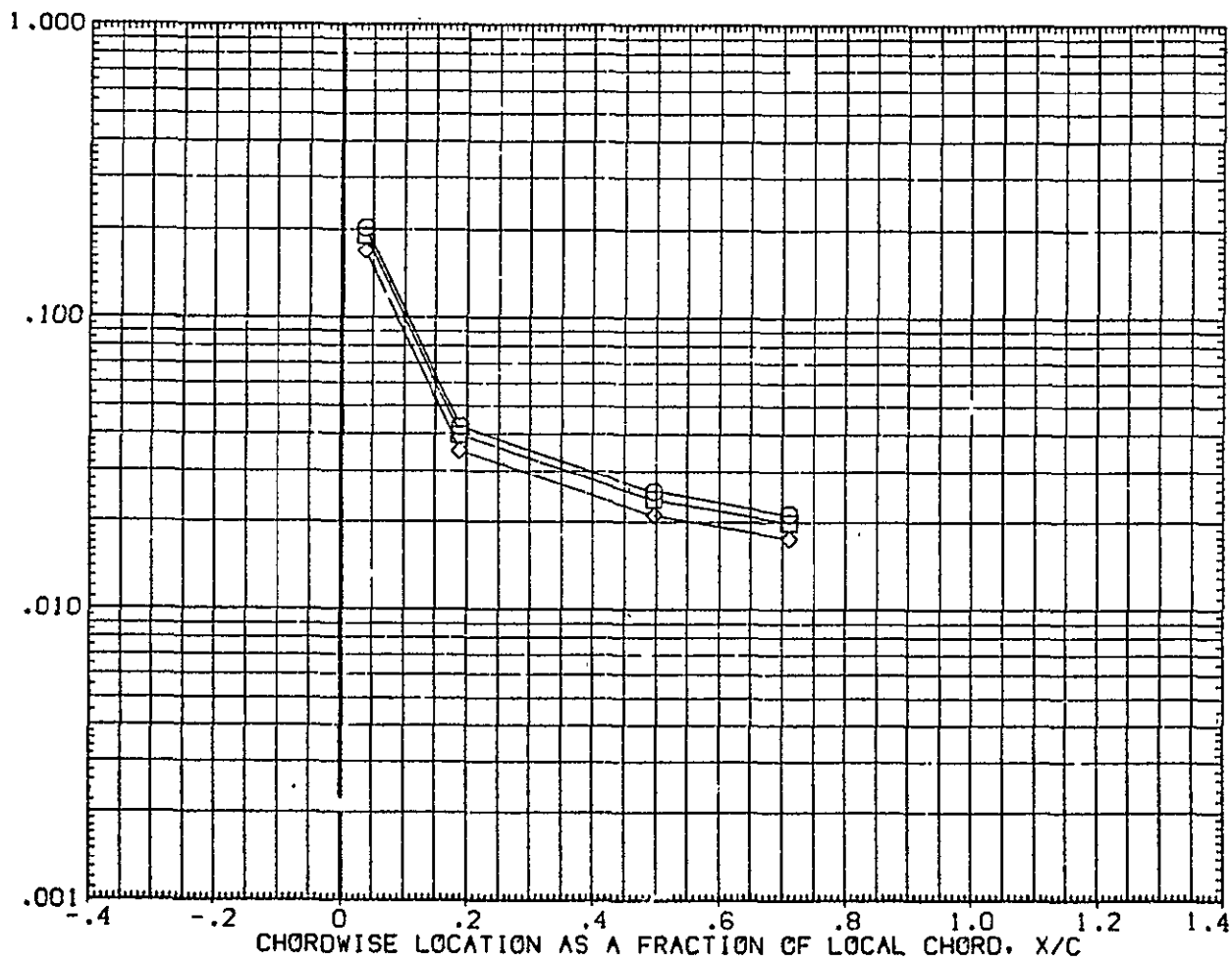
SYMBOL	HAW/HT	ZY/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	.400	15.060	.000		.000
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0

WING L.S. (RUGW07)

SYMBOL	HAW/HT	ZV/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	.500	16.060	.000		
◇	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0

WING L.S.(RUGWD7)

SYMBOL	HAW/HT	ZY/B	PACH	PARAMETRIC VALUES		
○	.850	.600	16.060	ALPHA	.000	BETA
□	.900					
◇	1.000					

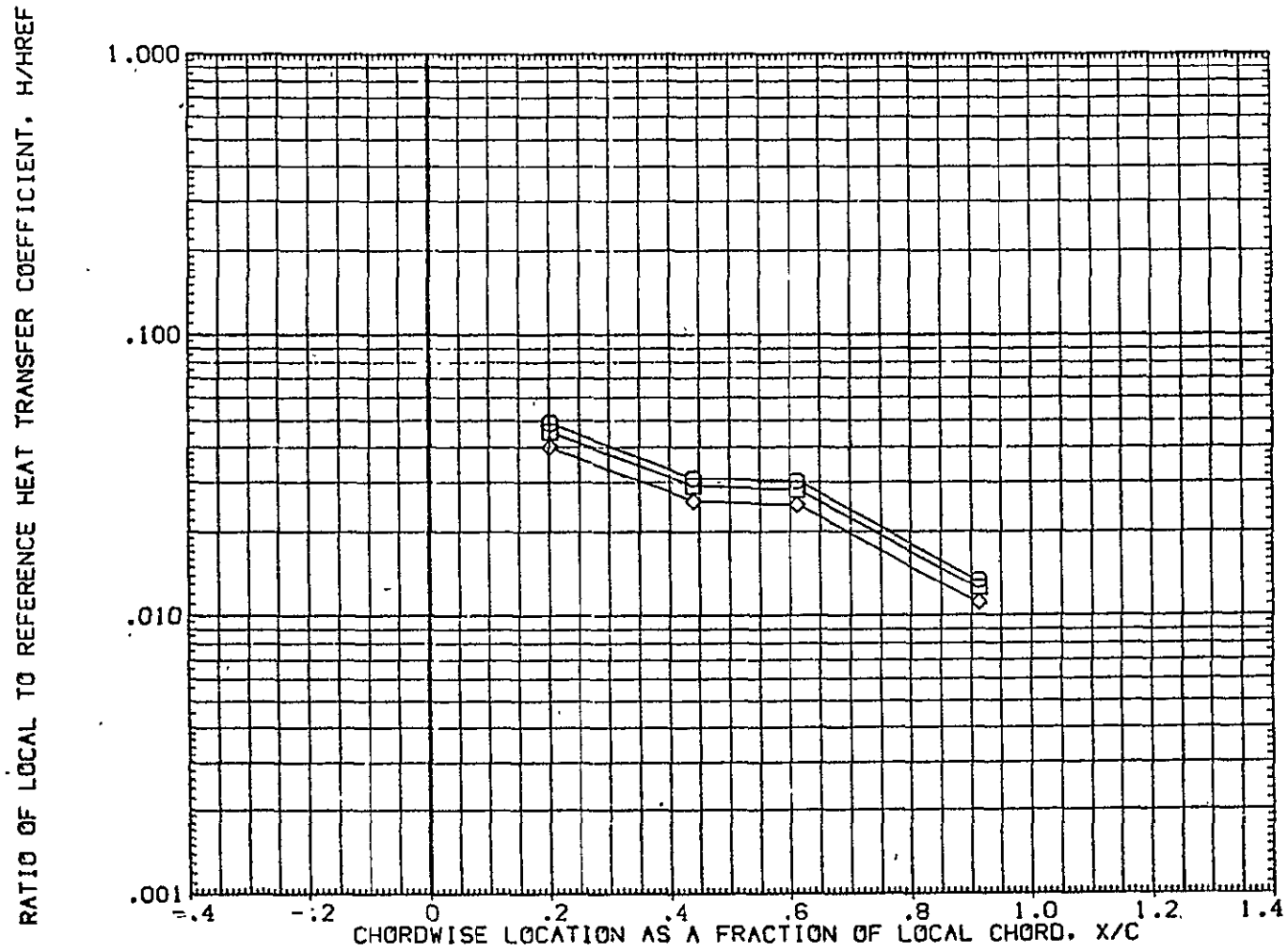
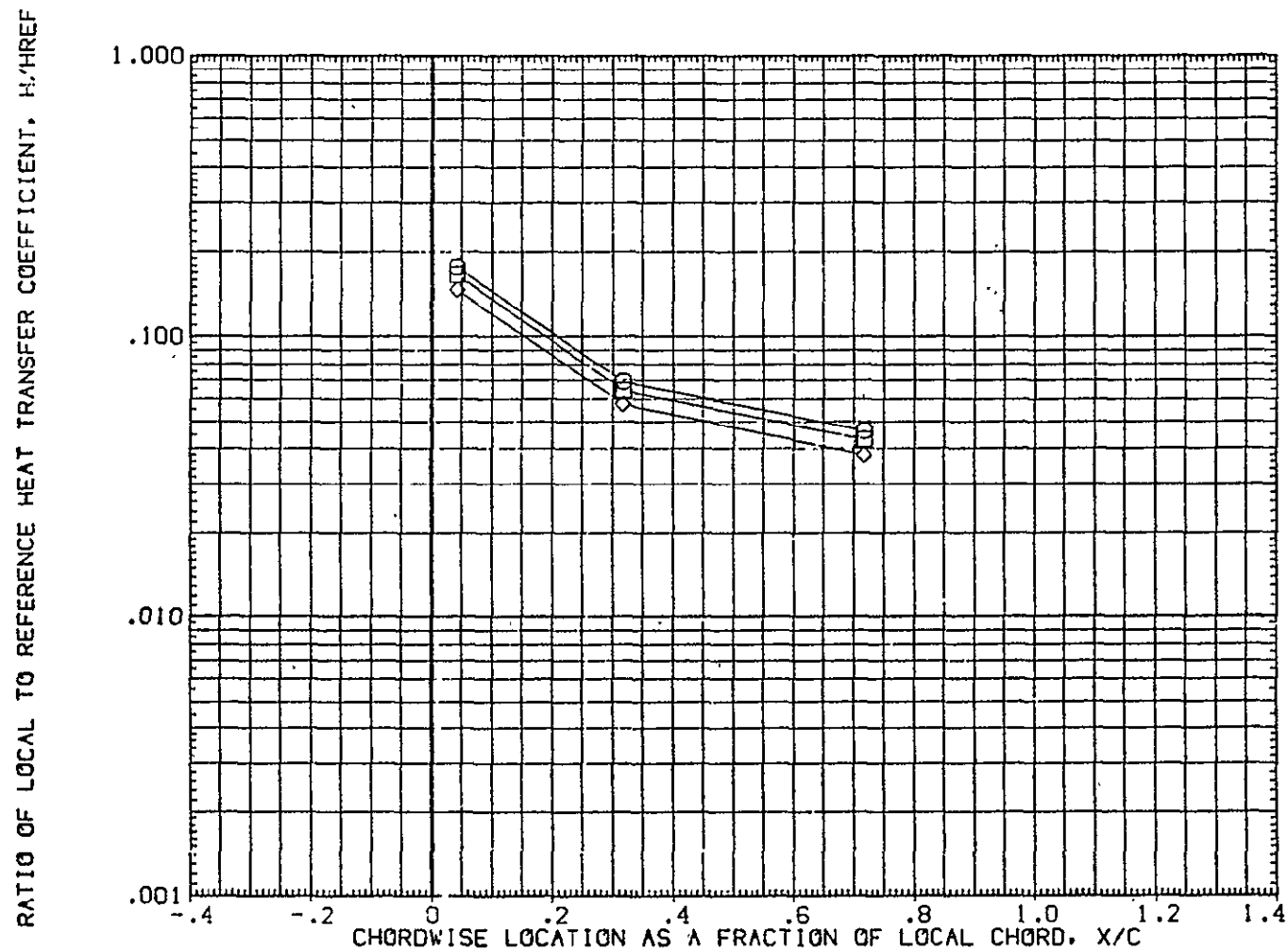


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0

WING L.S. (RUGW07)

SYMBOL	HAW/HT	ZY/B	MACH	ALPHA	PARAMETRIC VALUES	
○	.850	.750	16.060	.000	BETA	.000
□	.900					
◇	1.000					

FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	.950	16.060	.000		.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

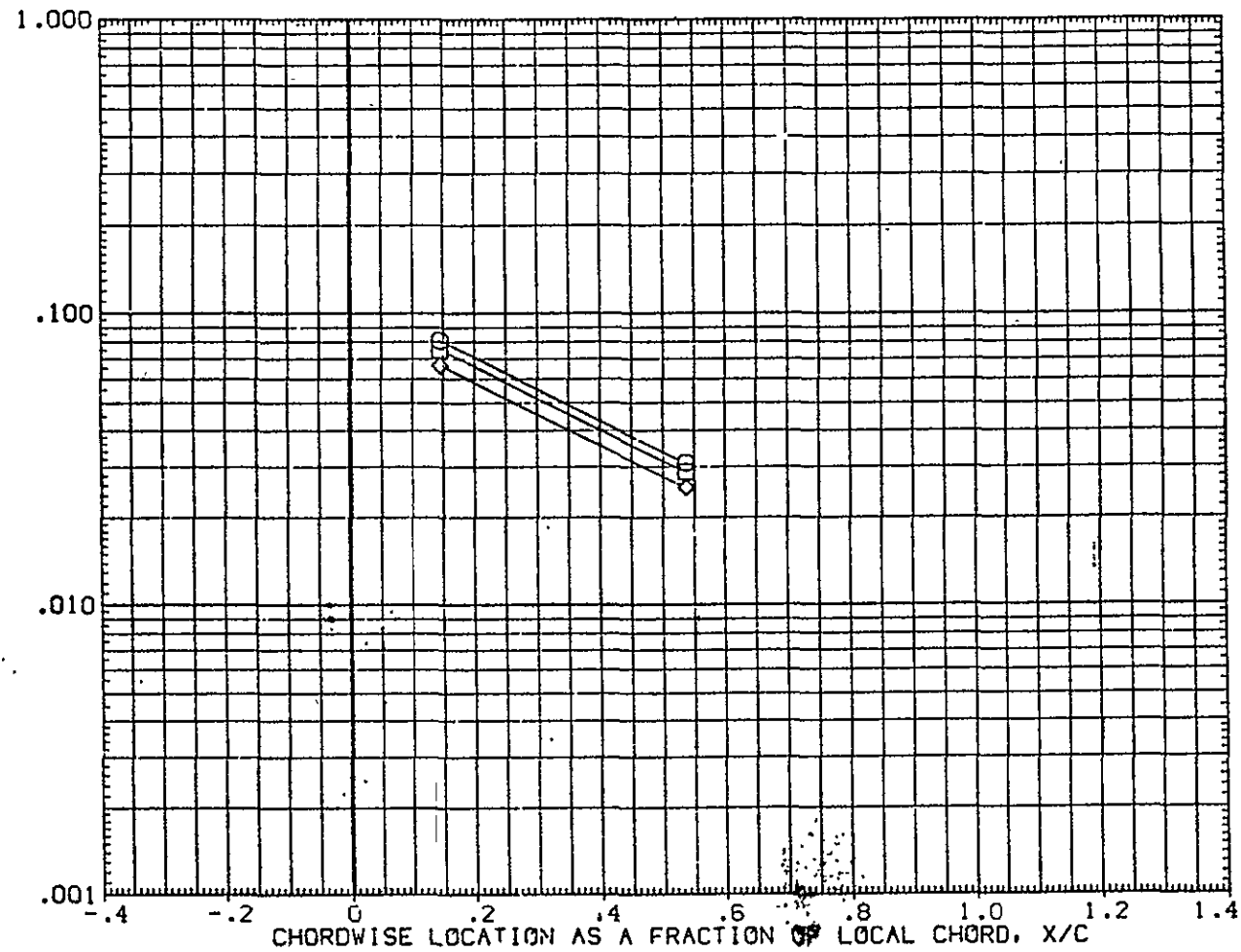
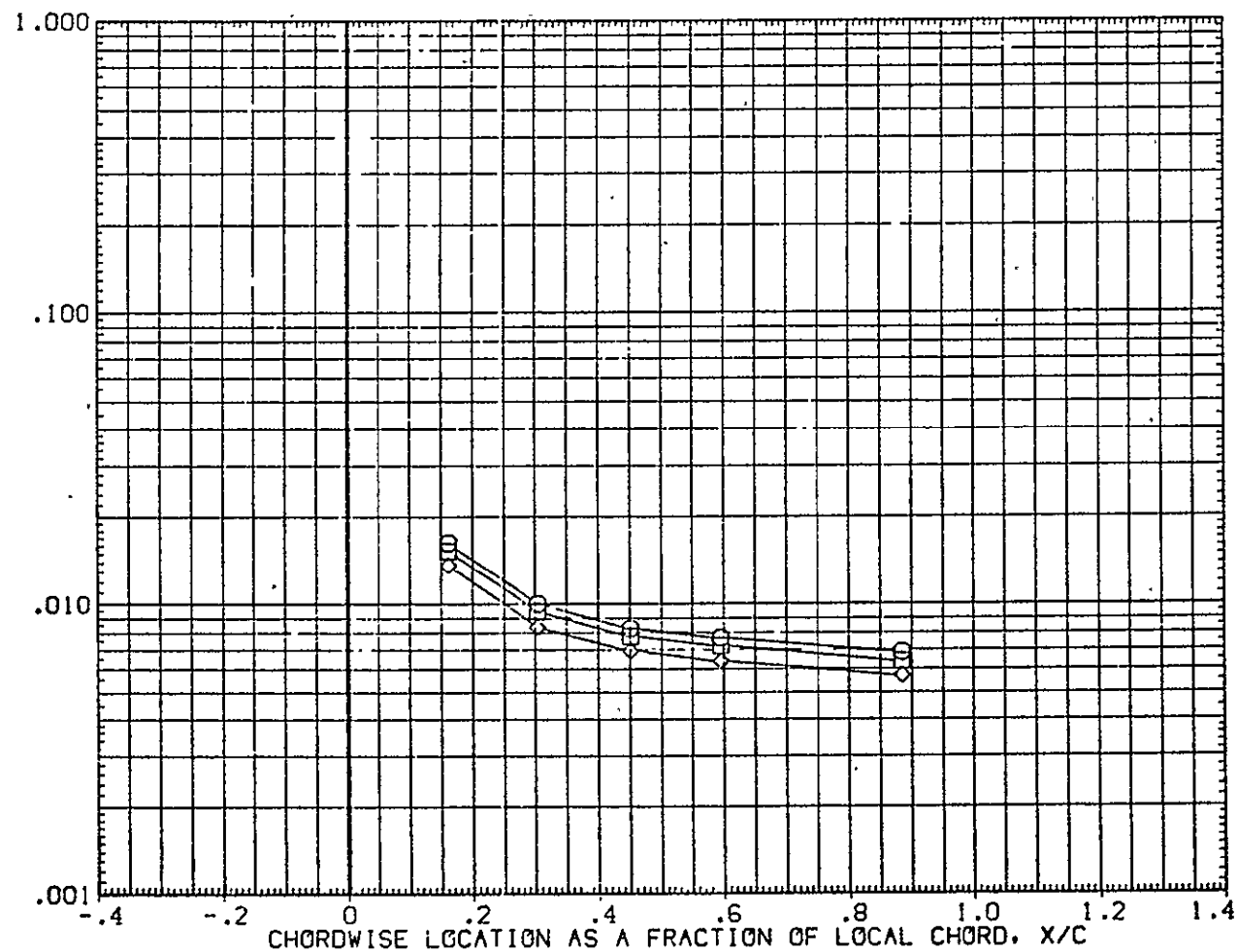


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 0

WING L.S. (RUGW07)

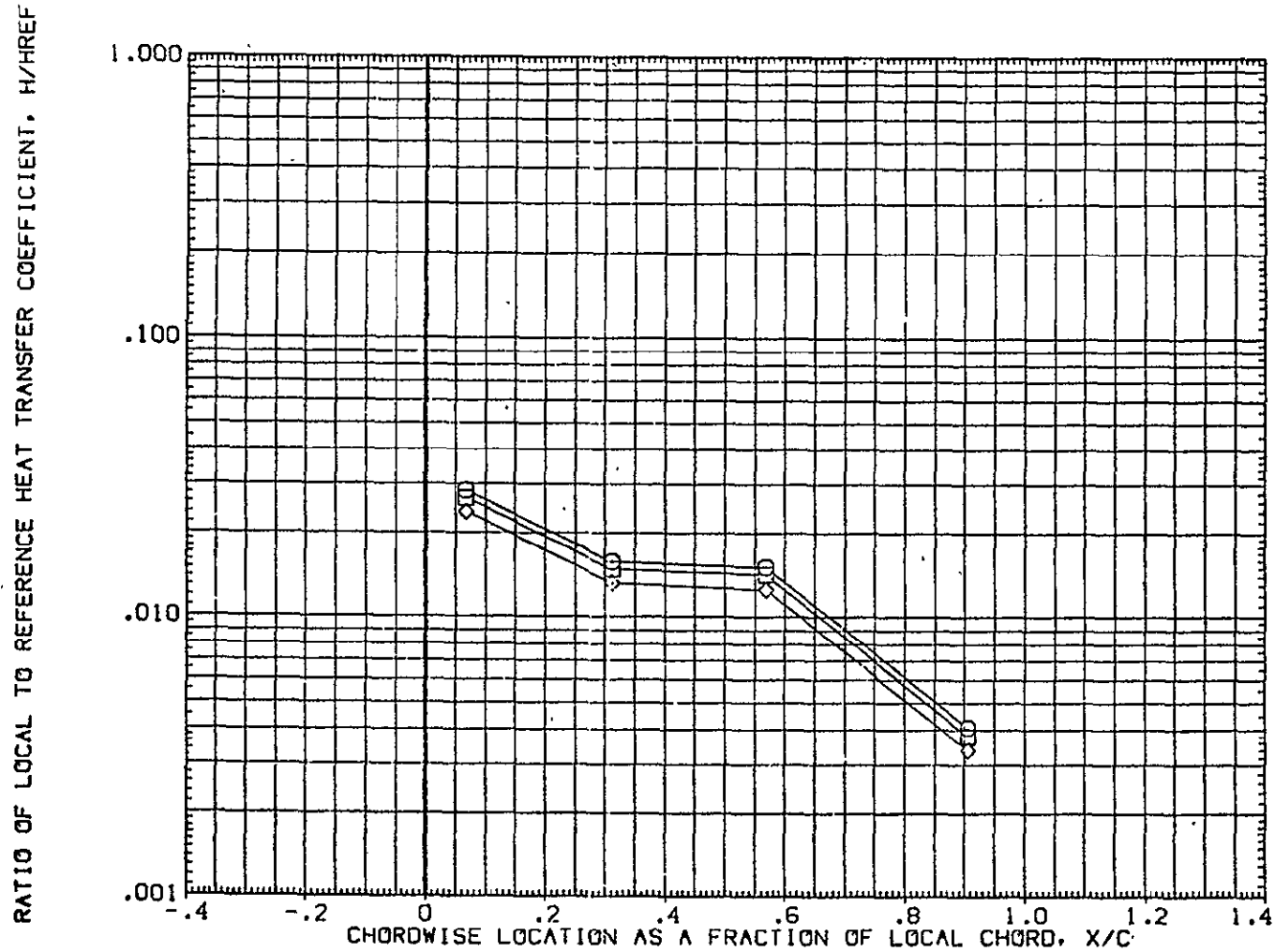
SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	.250	18.310	.000	.000	.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0

WING L.S. (RUGW07)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	.400	18.310	.000		
□	.900					
◇	1.000					

FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha \approx 0$

0H12/1H21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	2Y/B	PACH	ALPHA	PARAMETRIC VALUES	BETA
○	.850	.500	18.310	.000		.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

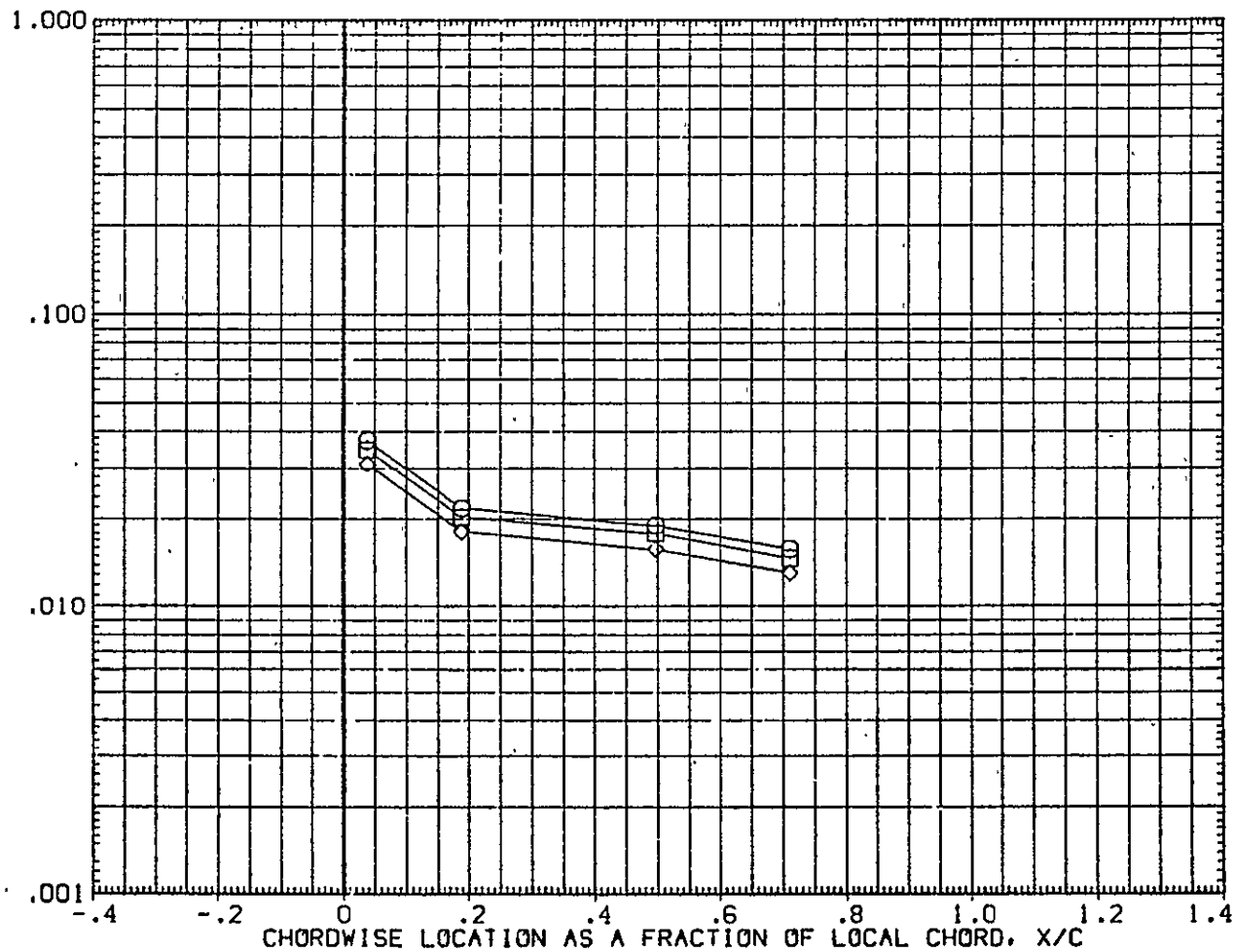


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

OH12/IH21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	.600	18.310	.000	.000	.000
□	.900					
◇	1.000					

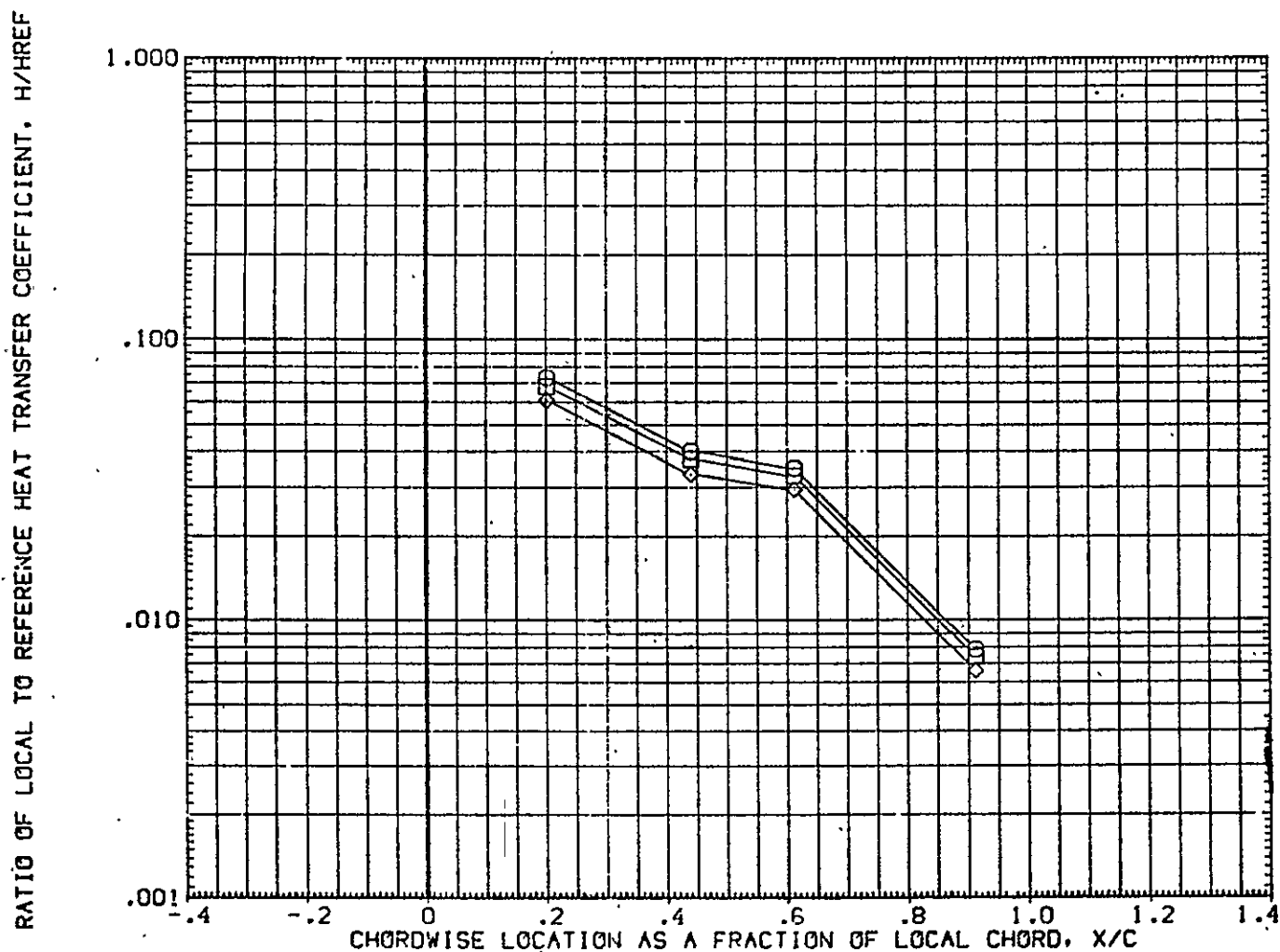


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
□	.850	.750	18.310	ALPHA	.000	BETA
◇	.800					.000
◇	1.000					

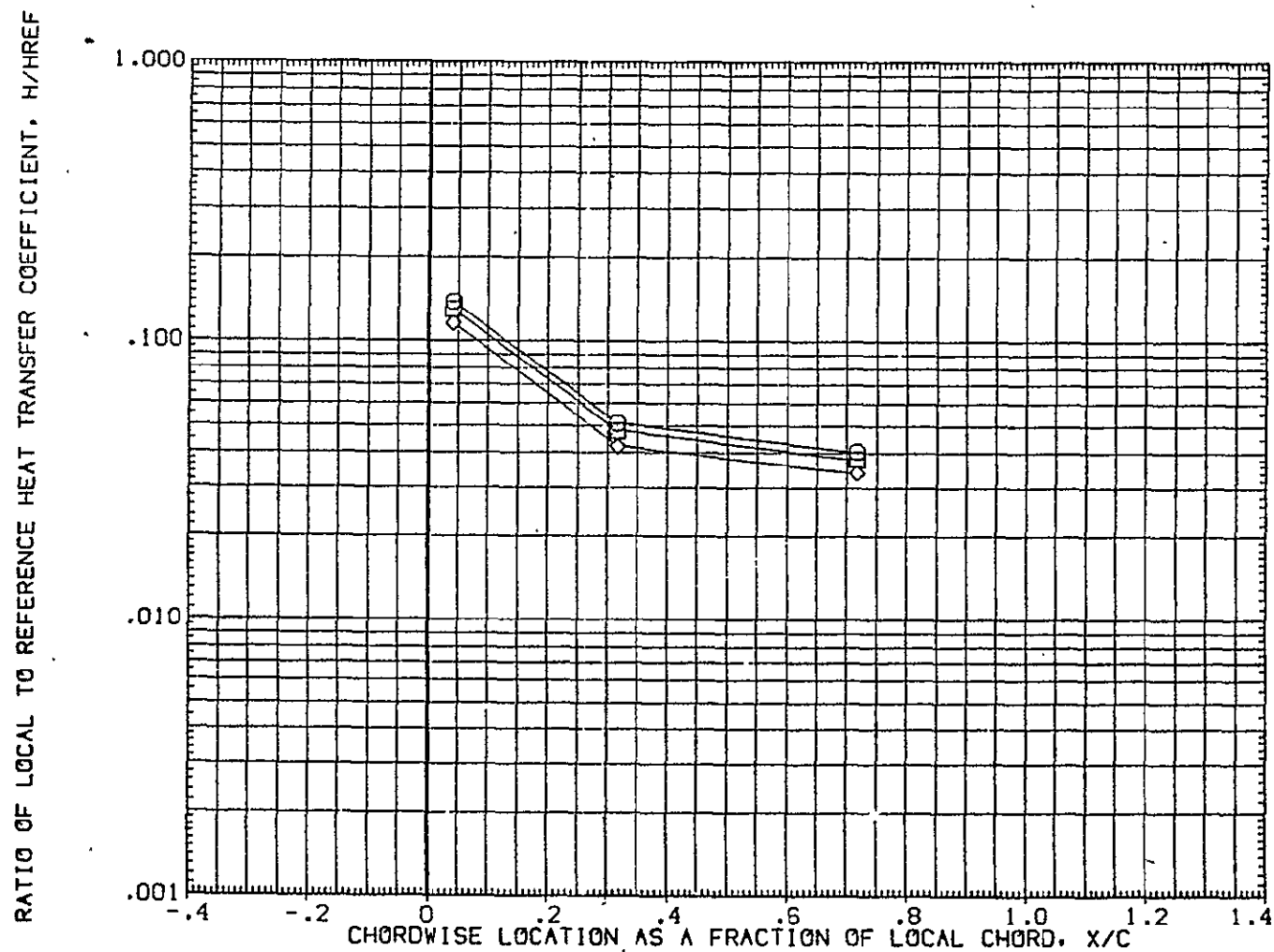


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	ZY/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	.950	18.310	.000	.000	.000
□	.900					
◇	1.000					

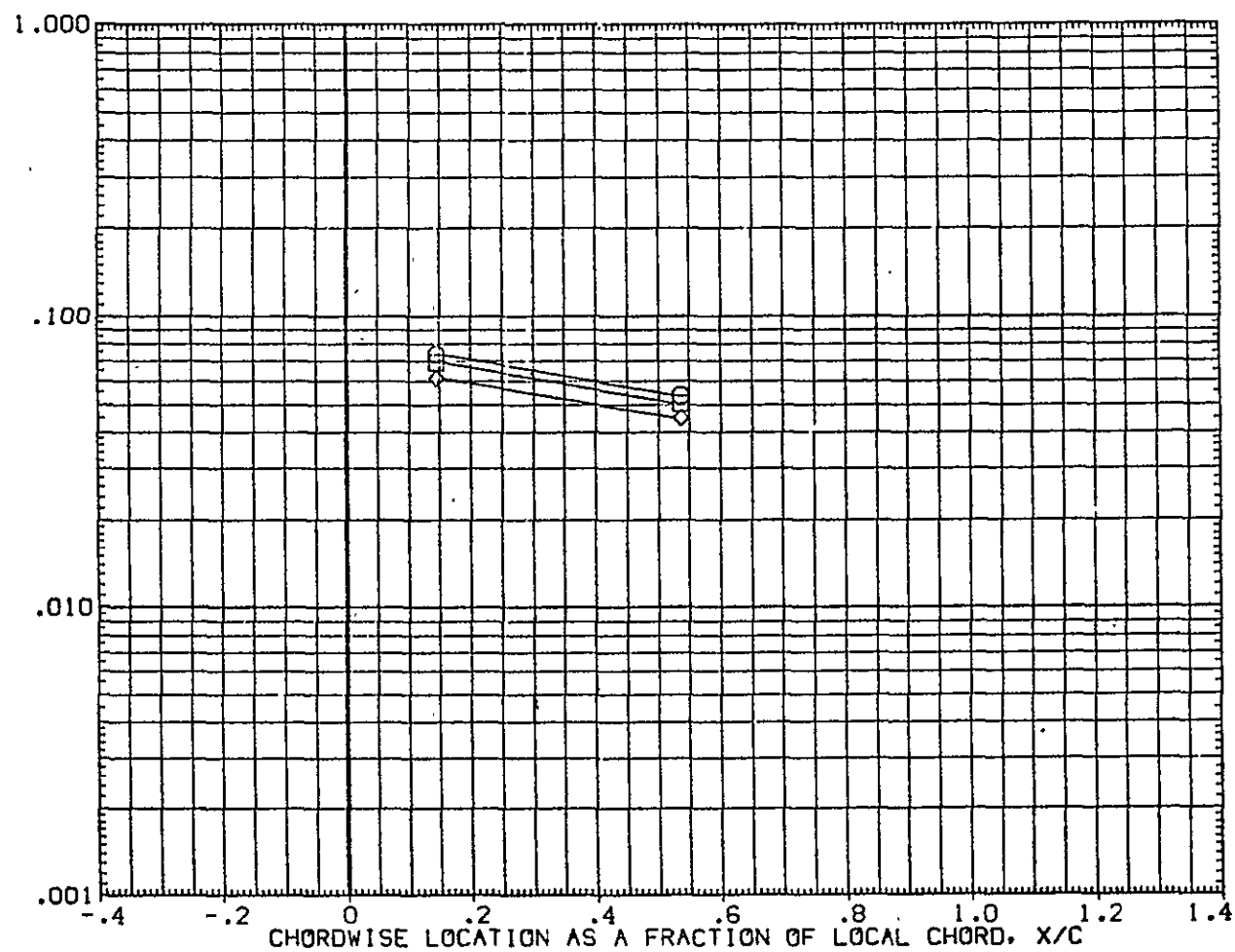
RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} 

FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12/1H21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	.250	19.190	.000	.000	.000
□	.900					
□	1.000					

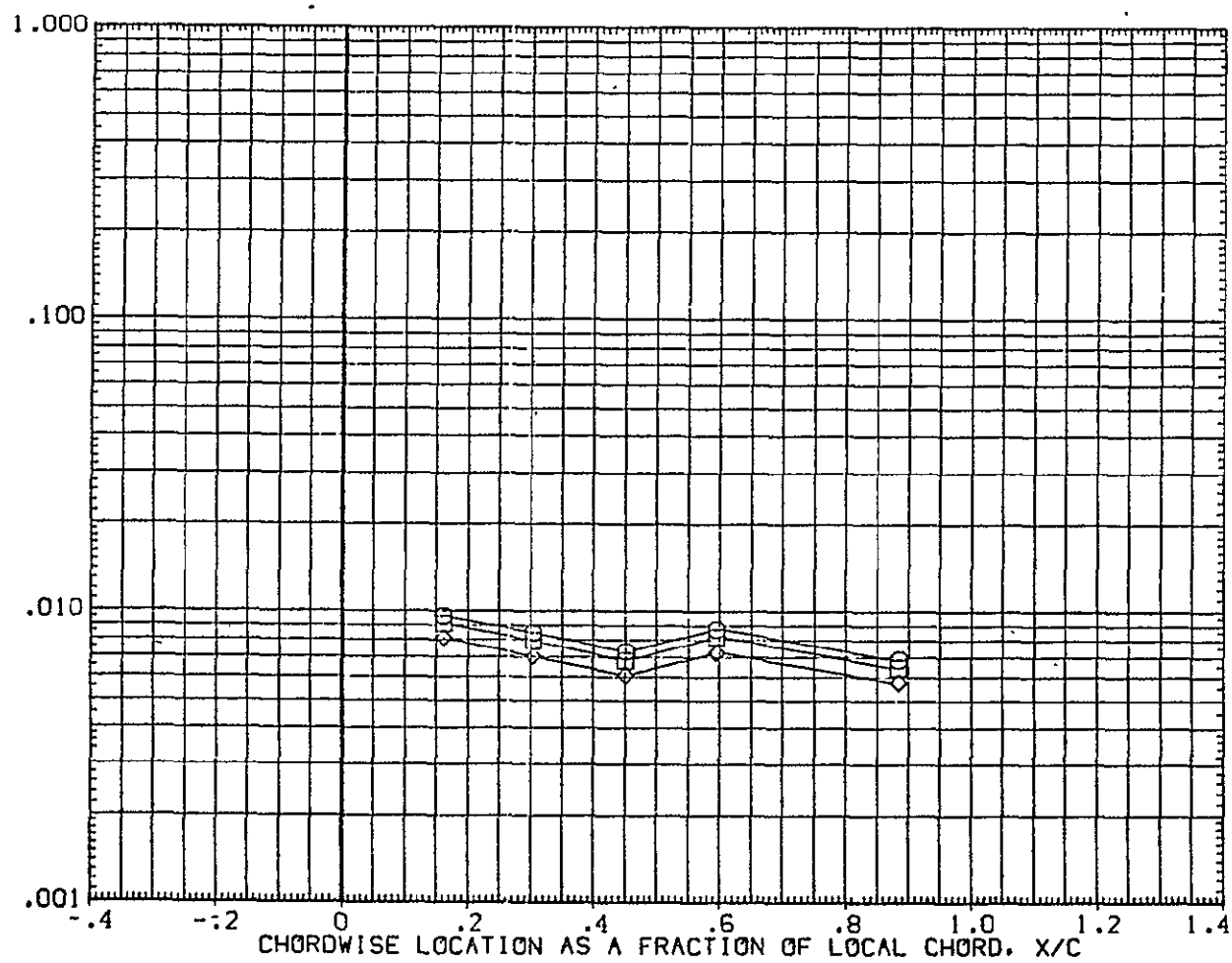
RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} 

FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA. = 0

OH12/IH21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL
○
□
◇

HAW/HT
.850
.900
1.000

ZY/B
.400

MACH
19.190

ALPHA

PARAMETRIC VALUES

.000

BETA

.000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

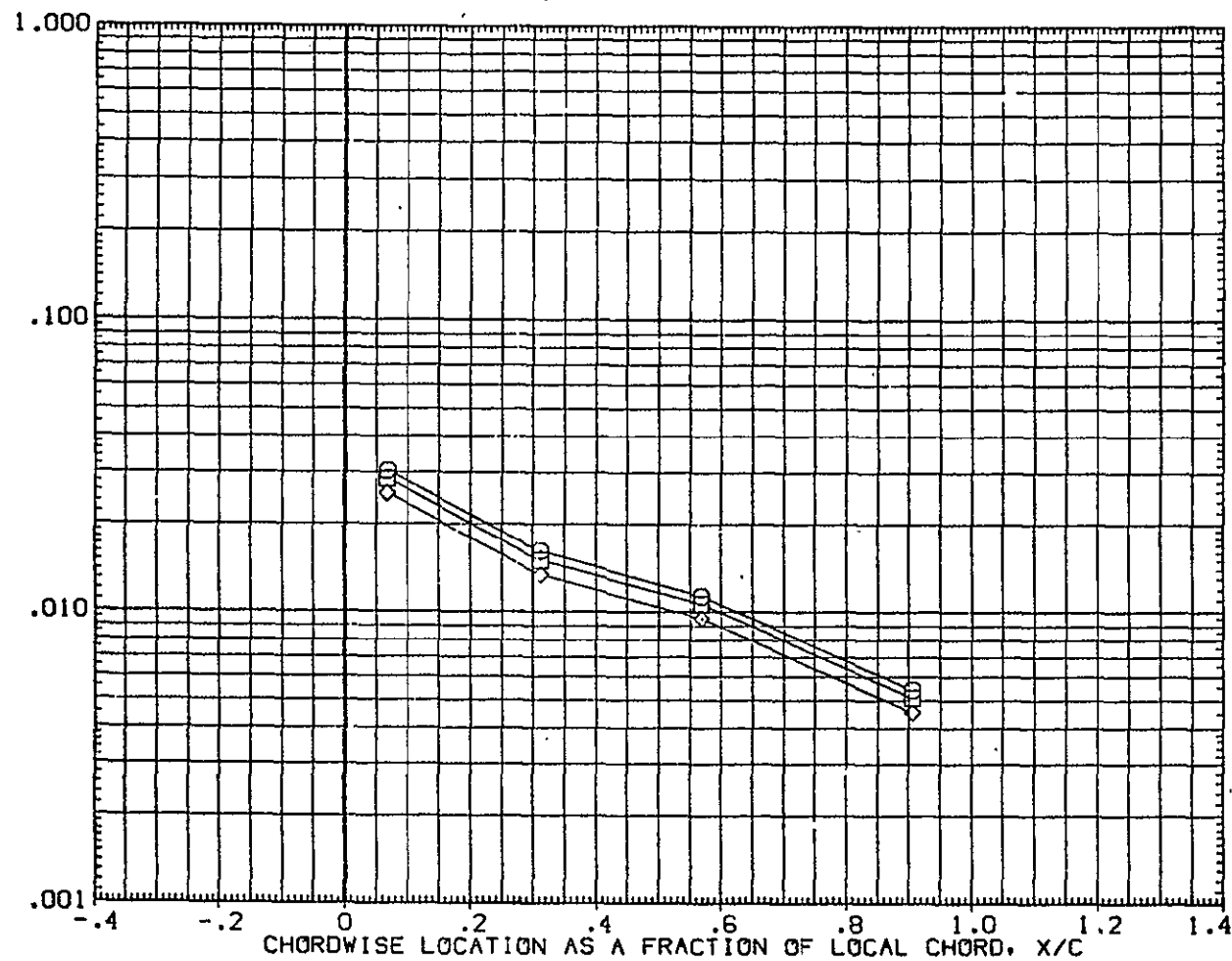


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	ZY/B	MACH	PARAMETRIC VALUES		
□	.850	.500	19.190	ALPHA	.000	BETA
◇	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

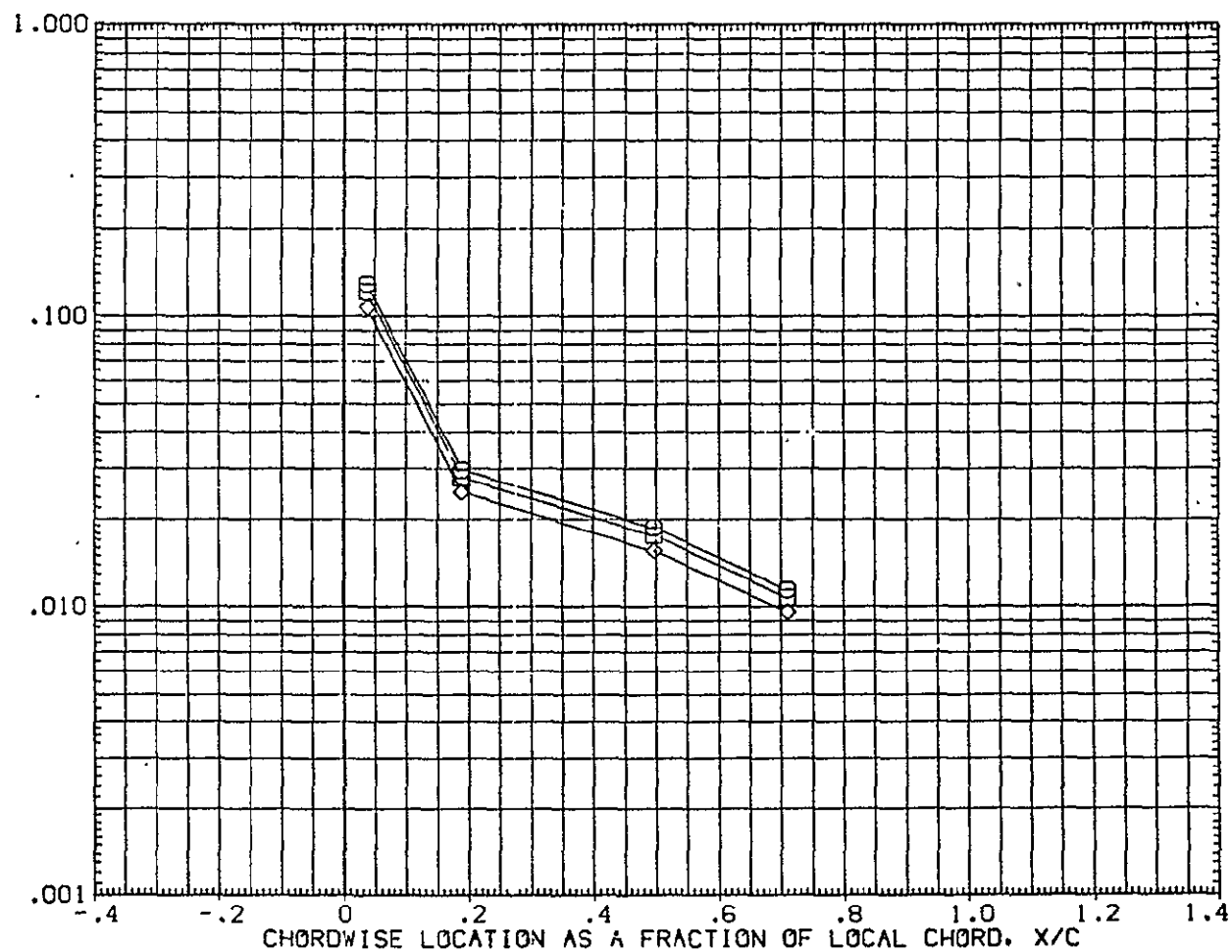


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0

WING L.S. (RUGW07)

SYMBOL	HAW/HT	ZY/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	.600	19.190	.000		
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

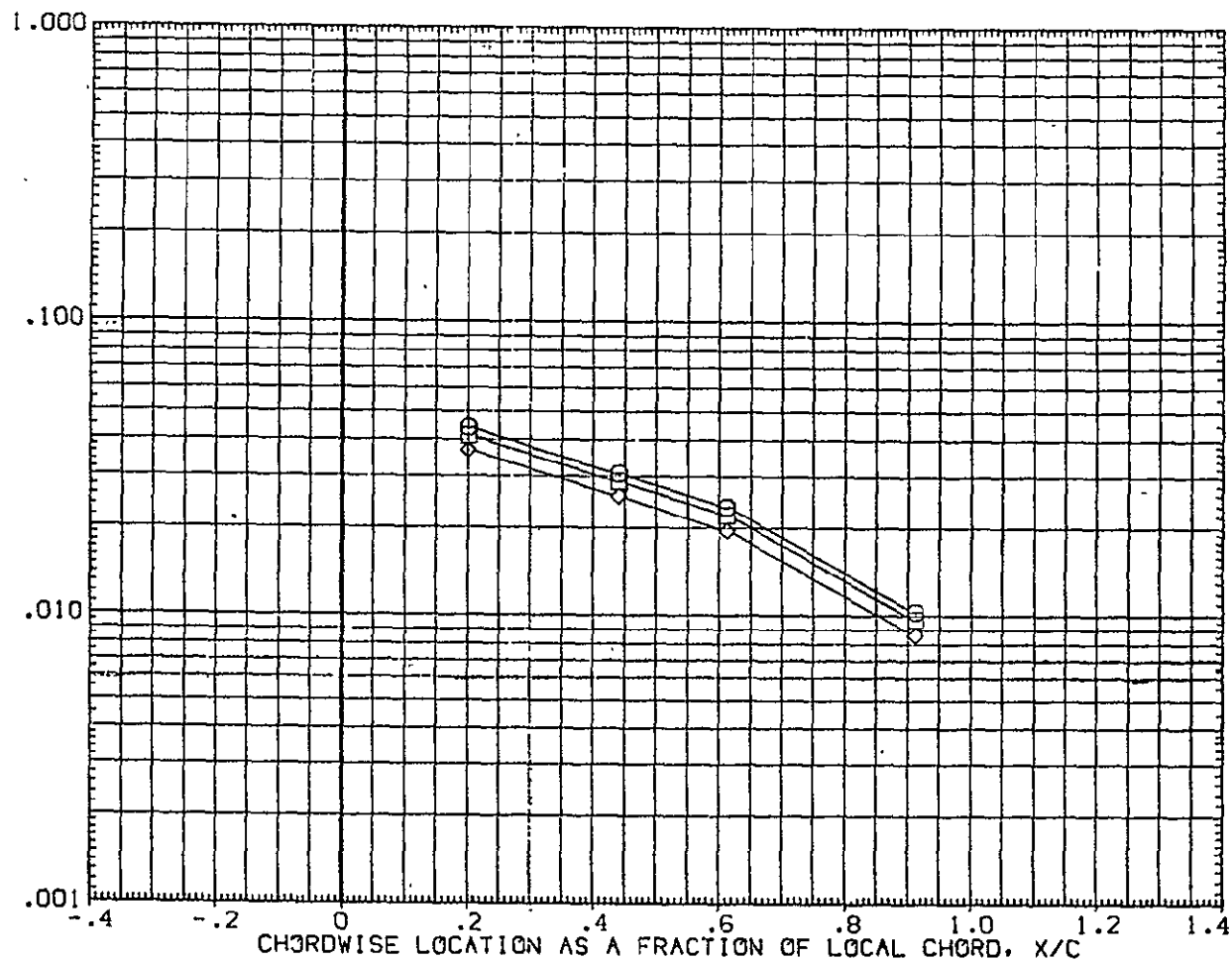


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	ZY/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	.750	19.190	.000	.000	.000
◇	.900					
	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

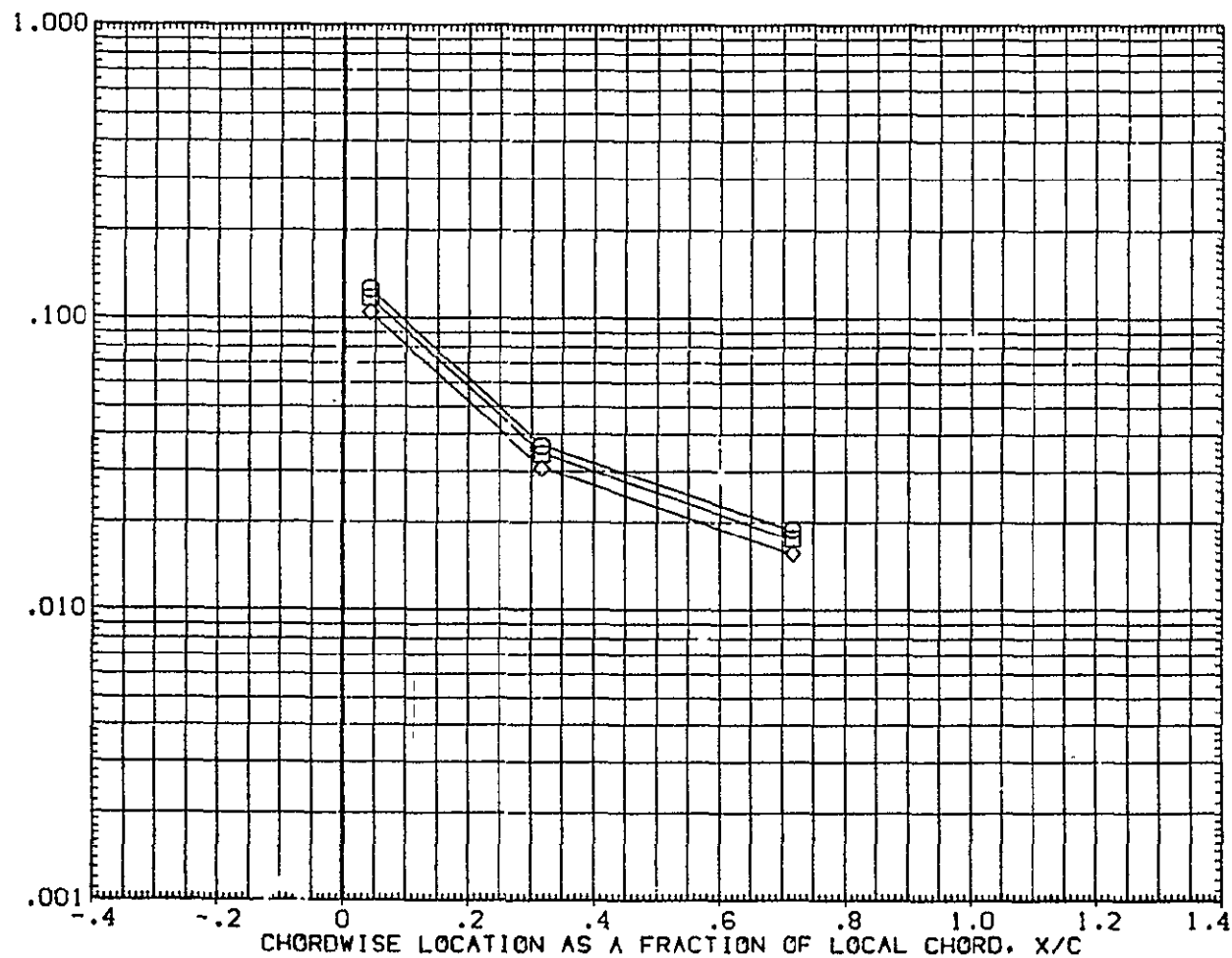


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0

WING L.S.(RUGW07)

SYMBOL	HAW/HT	ZY/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	.950	19.190	.000	.000	.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

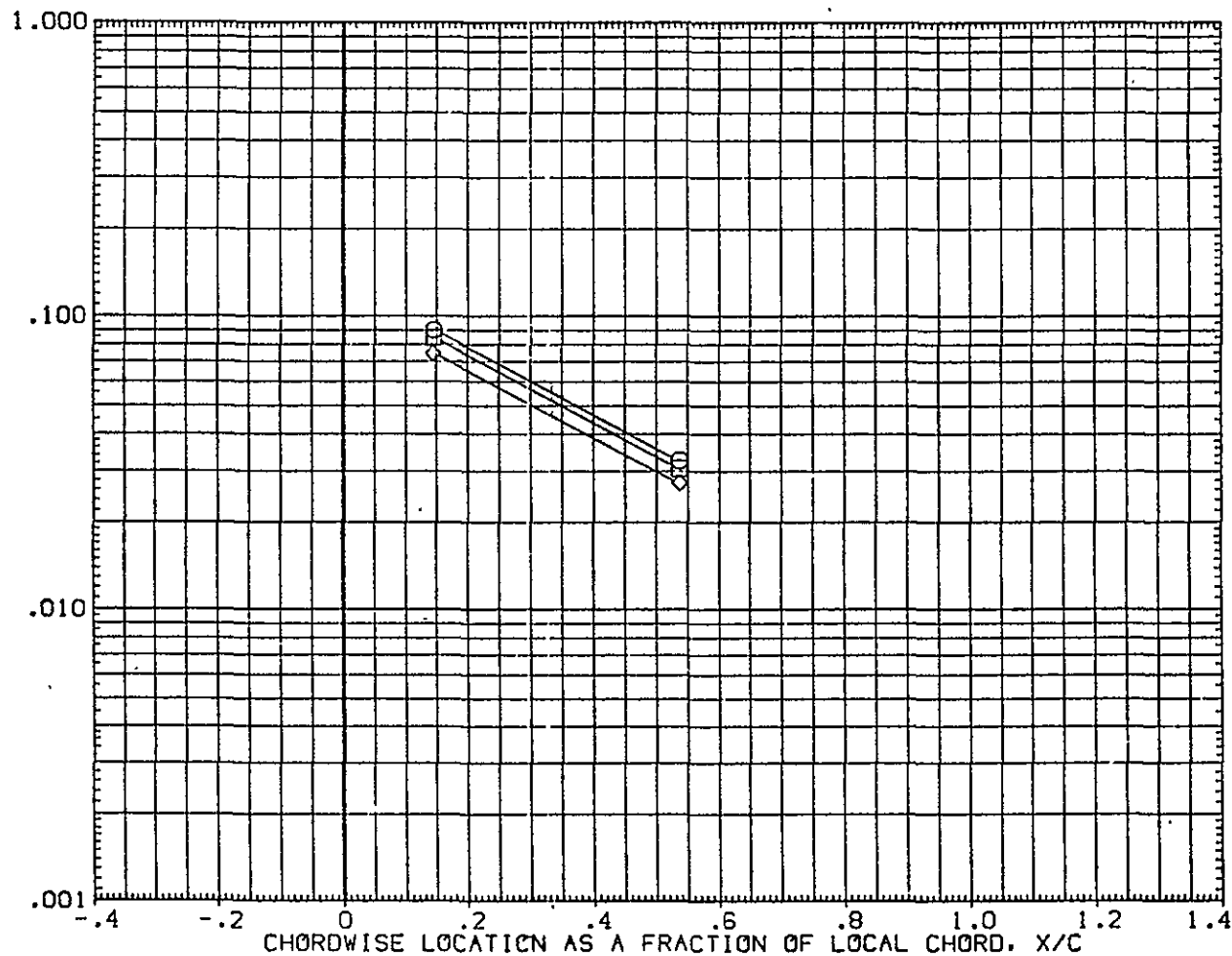


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/8	MACH	PARAMETRIC VALUES		
◇	.850	.250	6.999	ALPHA	.000	BETA
□	.900					.000
○	1.000					

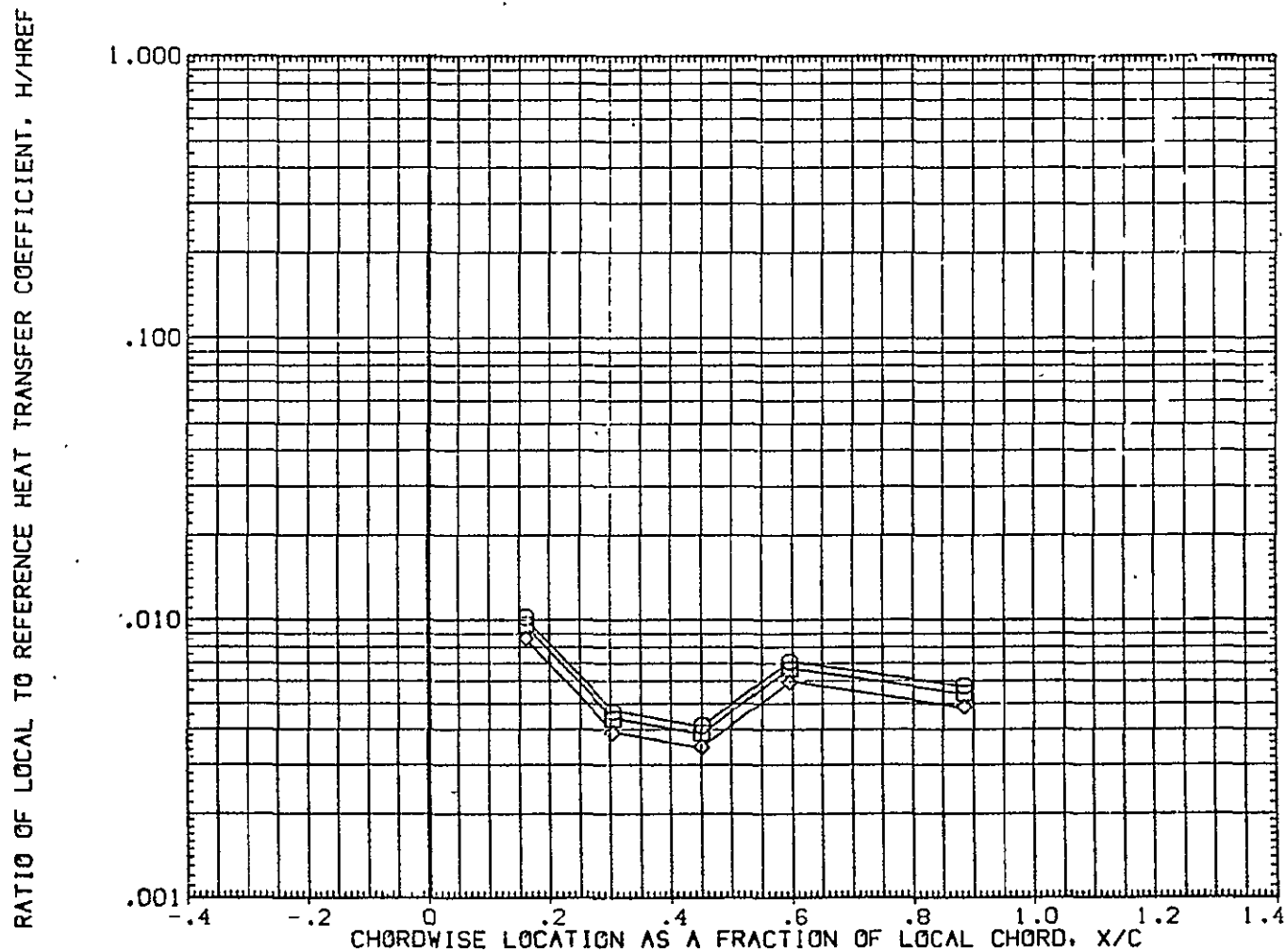


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha^* = 0$

OH12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

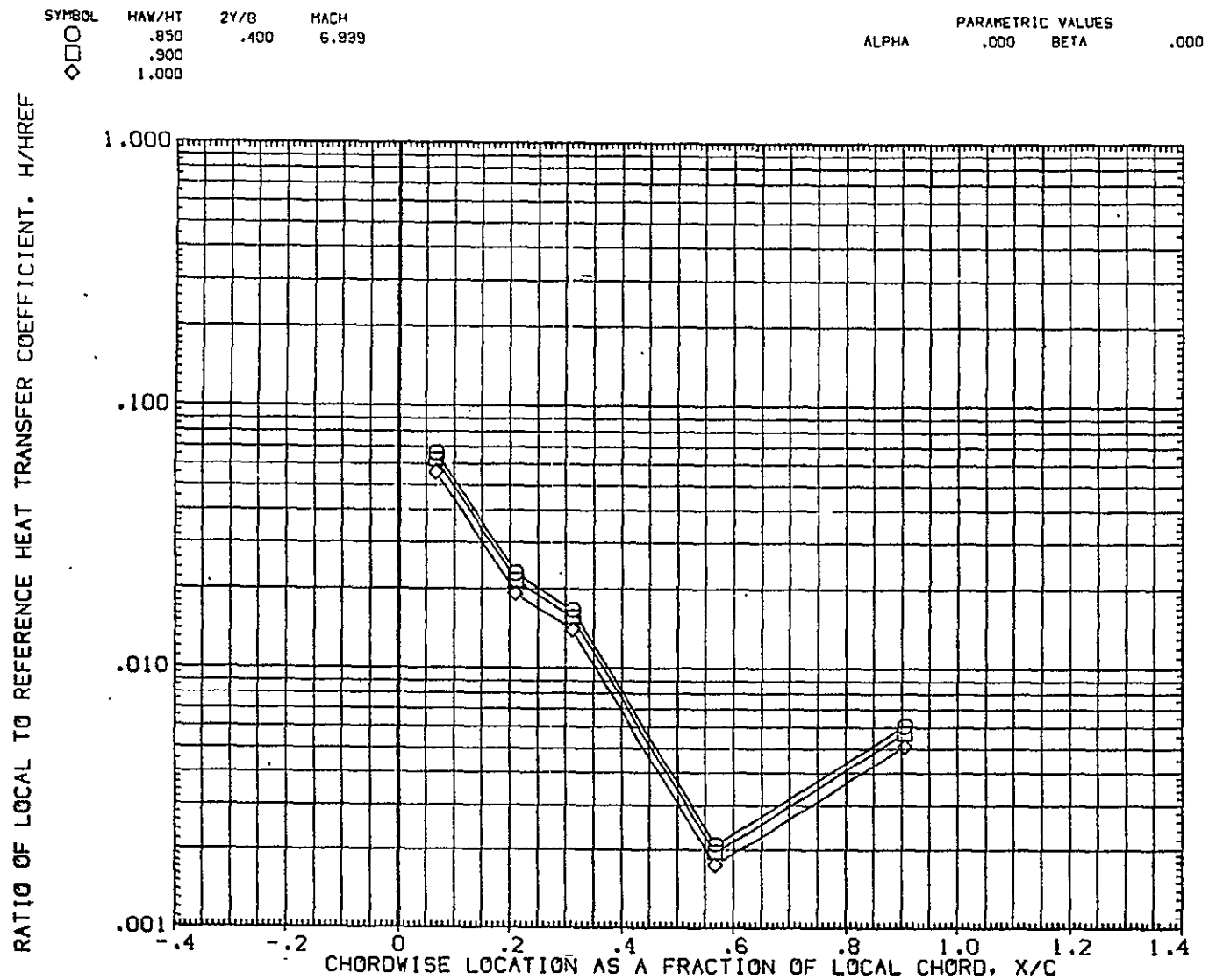


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES
○	.850	.500	6.999	ALPHA .000 BETA .000
□	.900			
◇	1.000			

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

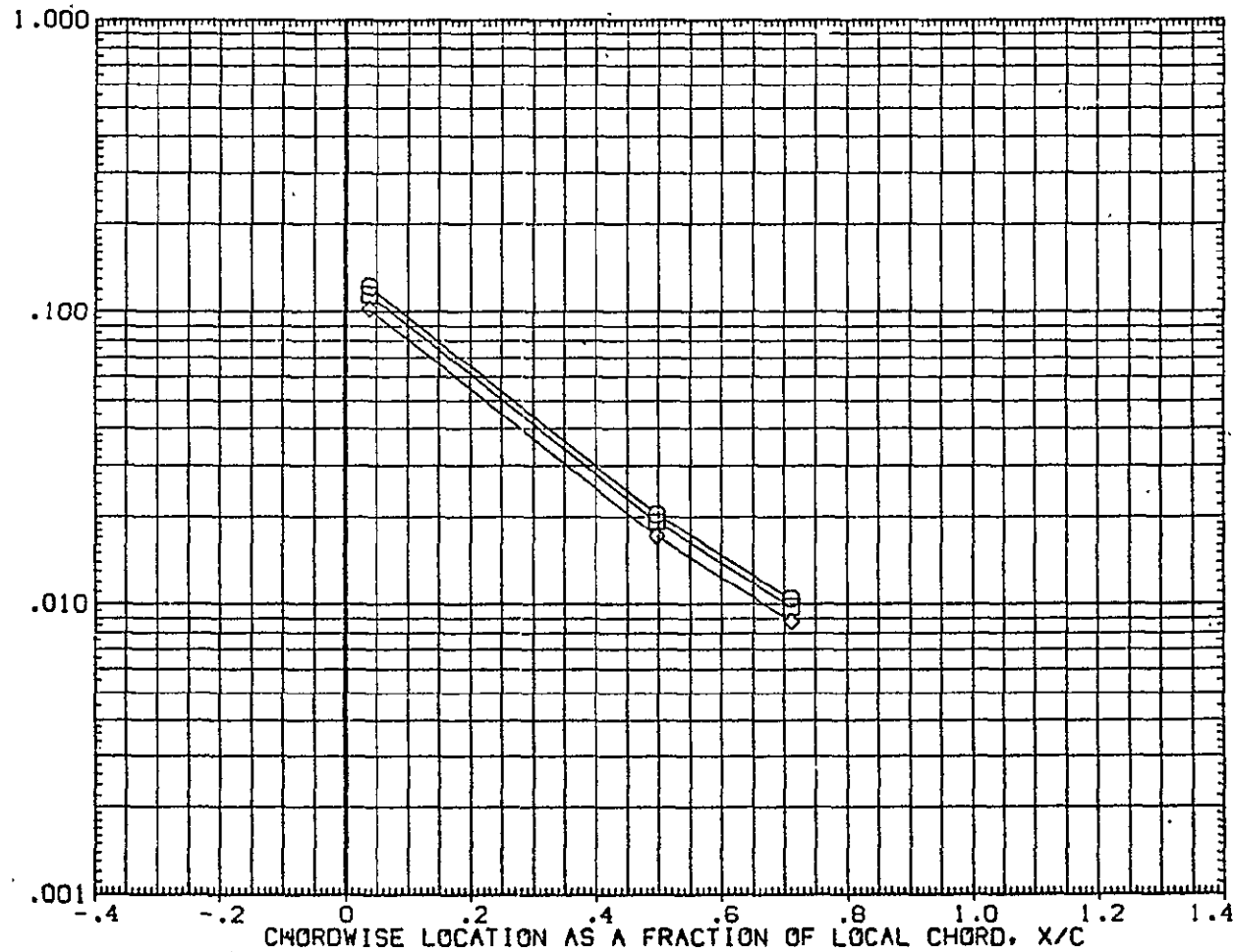


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

0H12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	.600	6.999	.000		.000
□	.900					
○	1.000					

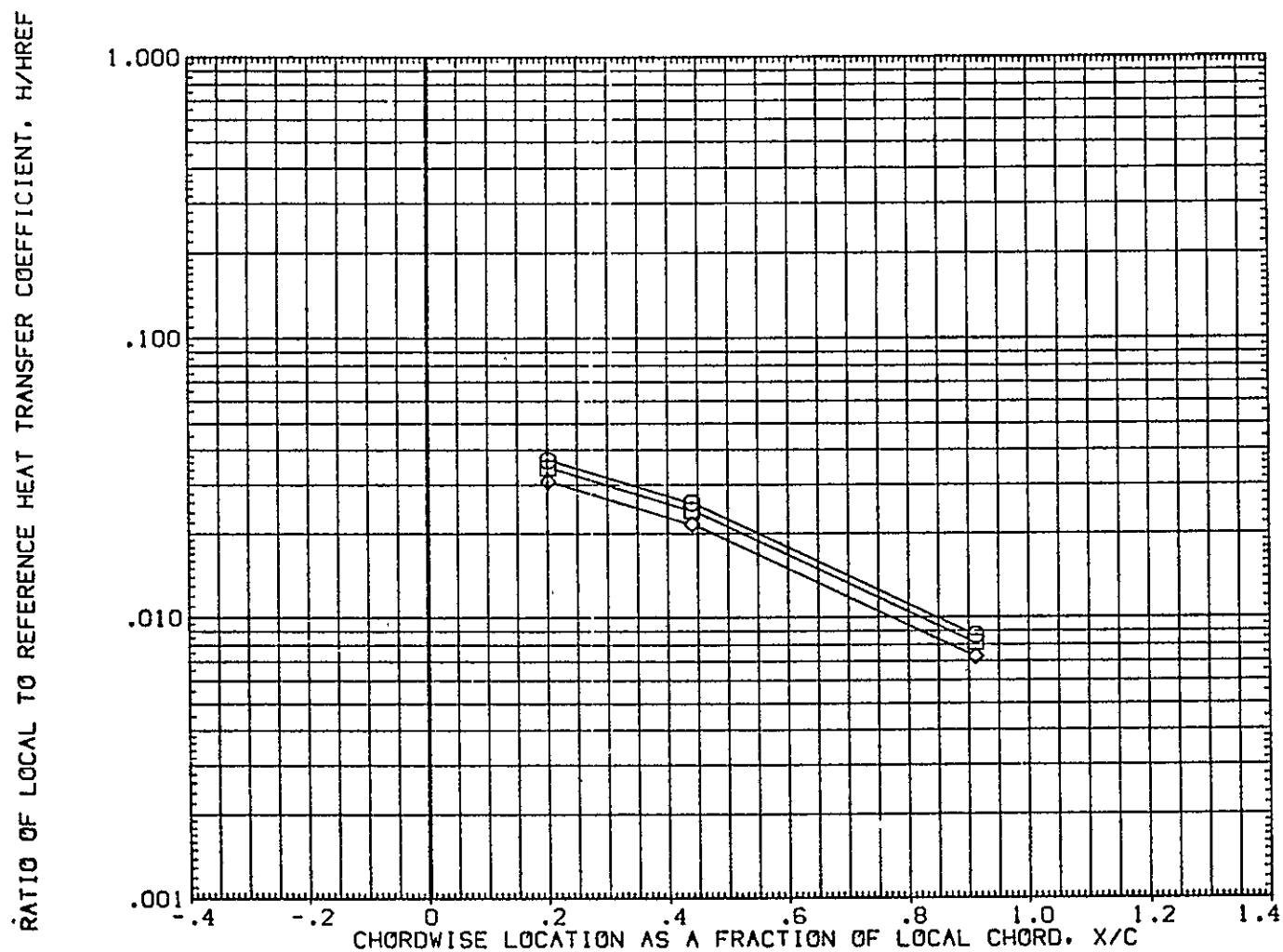


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	ZY/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	.750	6.999	.000	.000	
◇	.900					
	1.000					

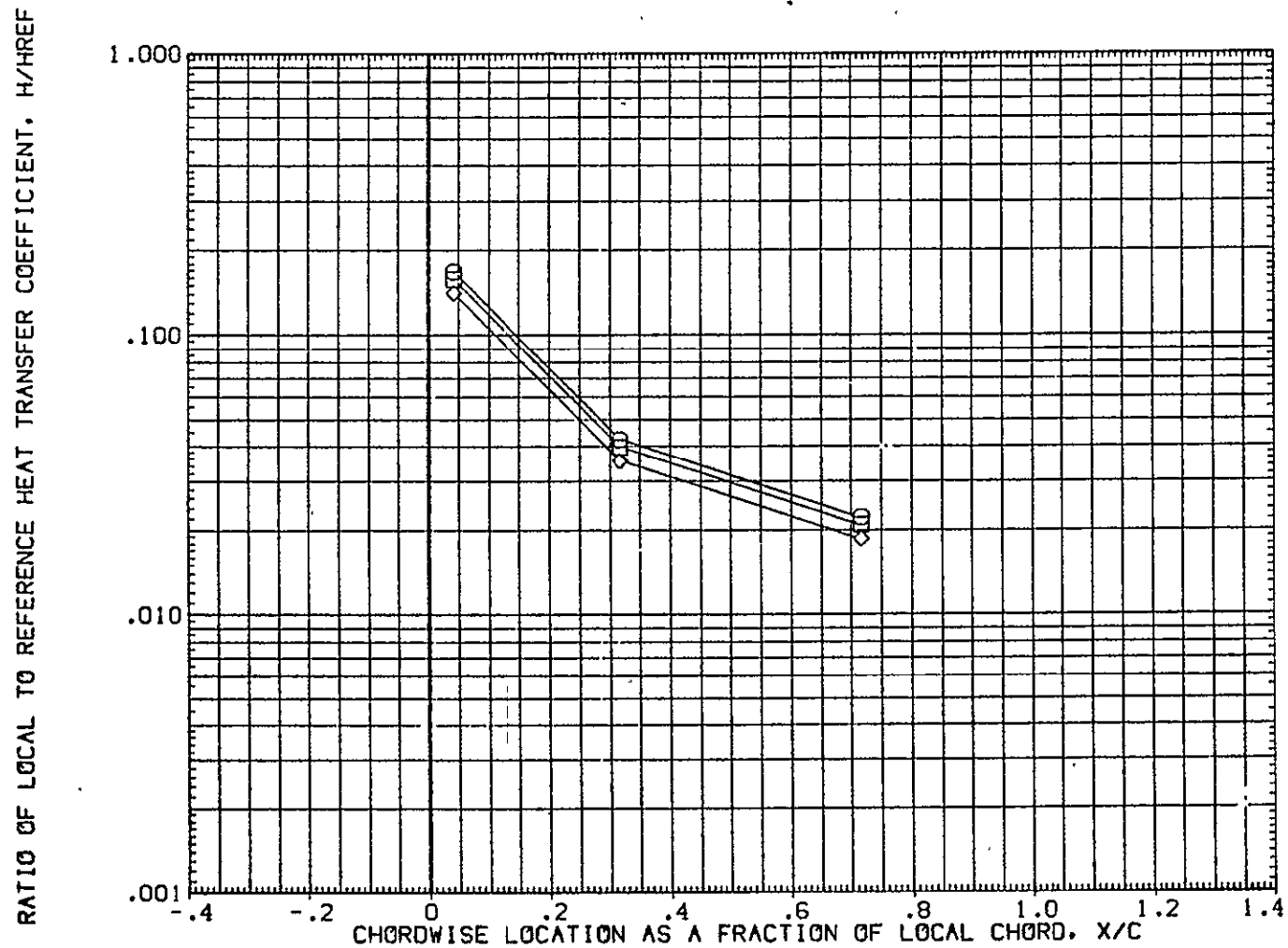


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	.950	6.999	.000		
◇	.900					
◇	1.000					

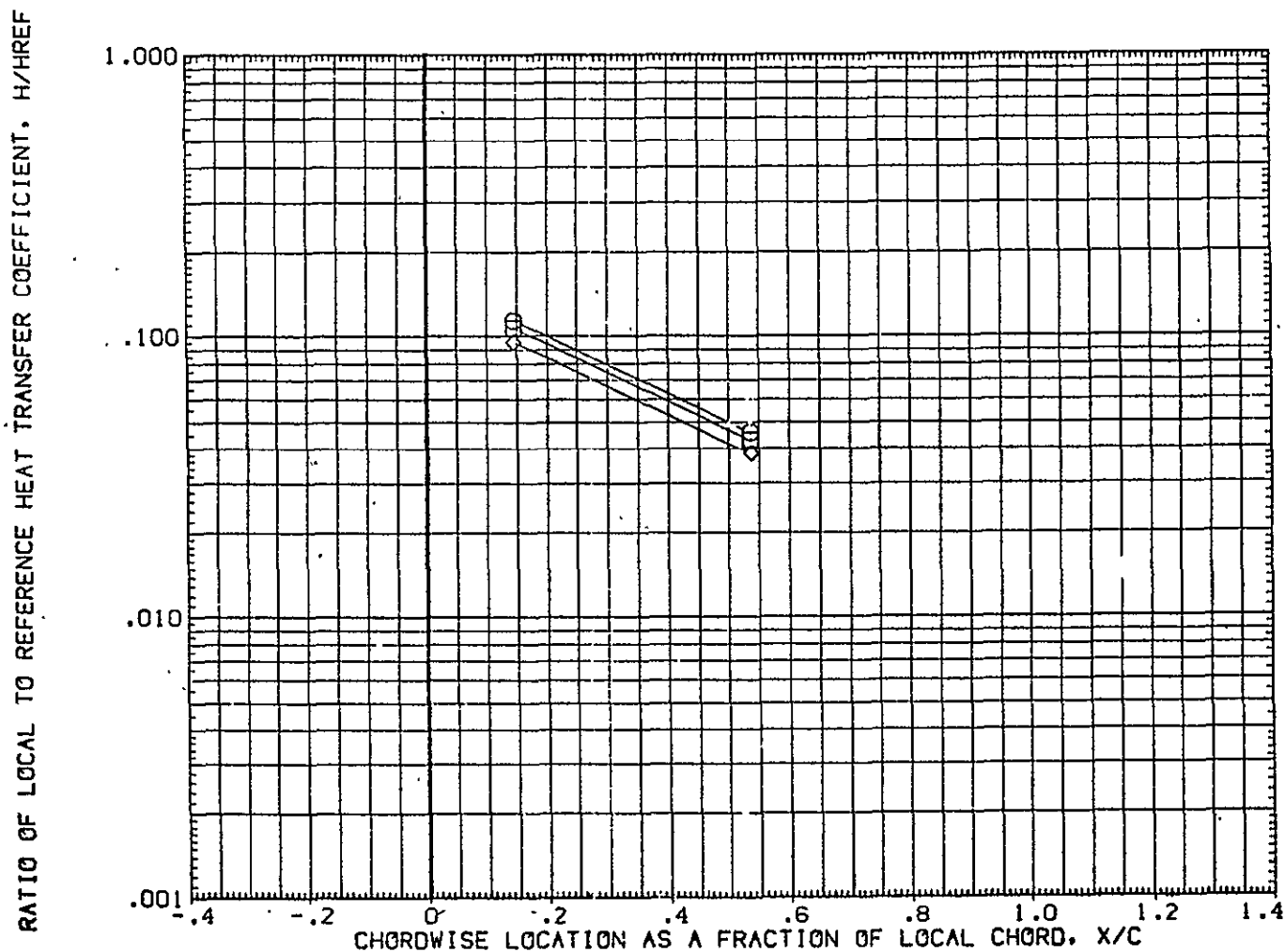


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12/JH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	ALPHA	PARAMETRIC VALUES	BETA	
□	.850	.250	7.616		.000		.000
◇	.900						
	1.000						

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

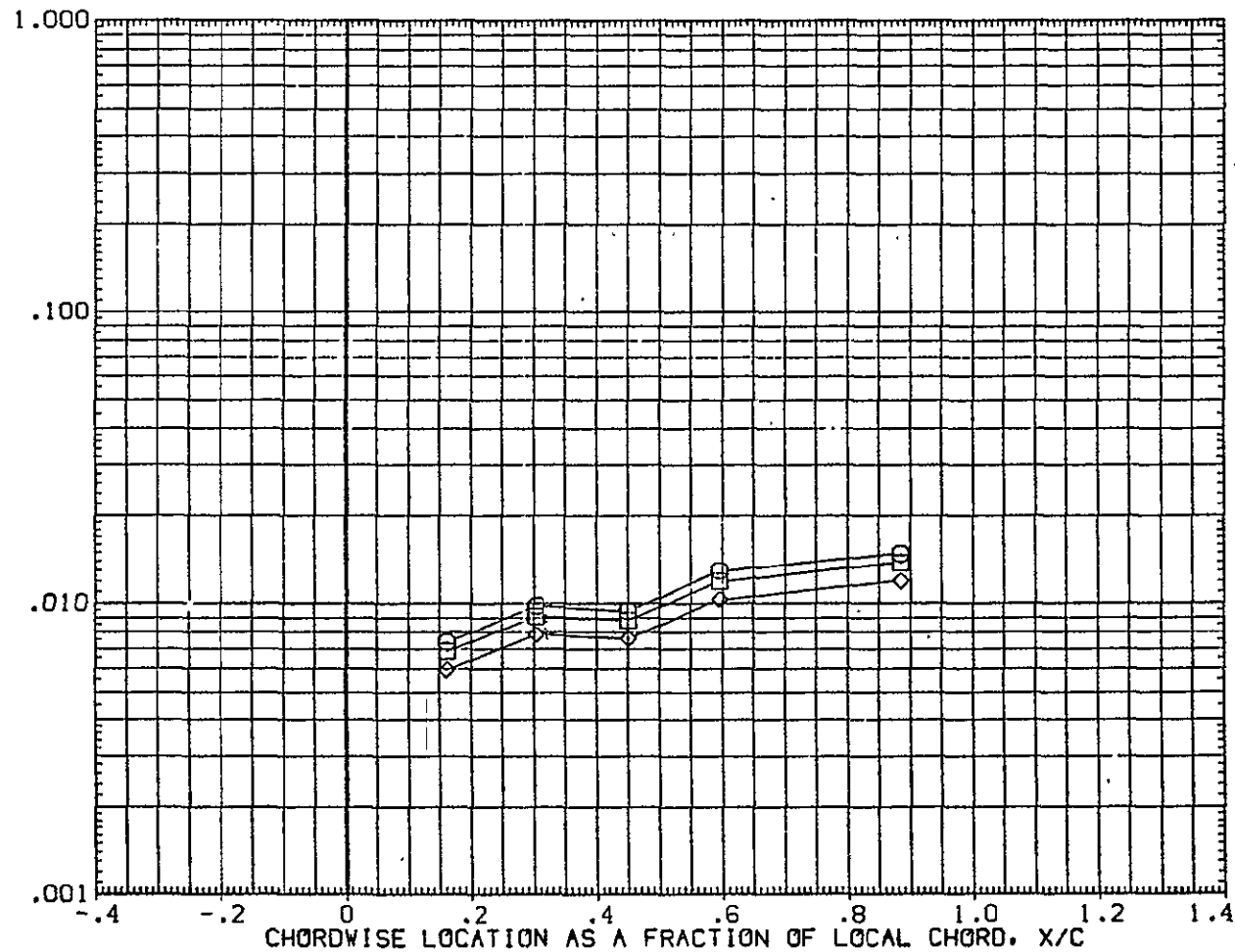


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	.400	7.616	.000		.000
□	.900					
○	1.000					

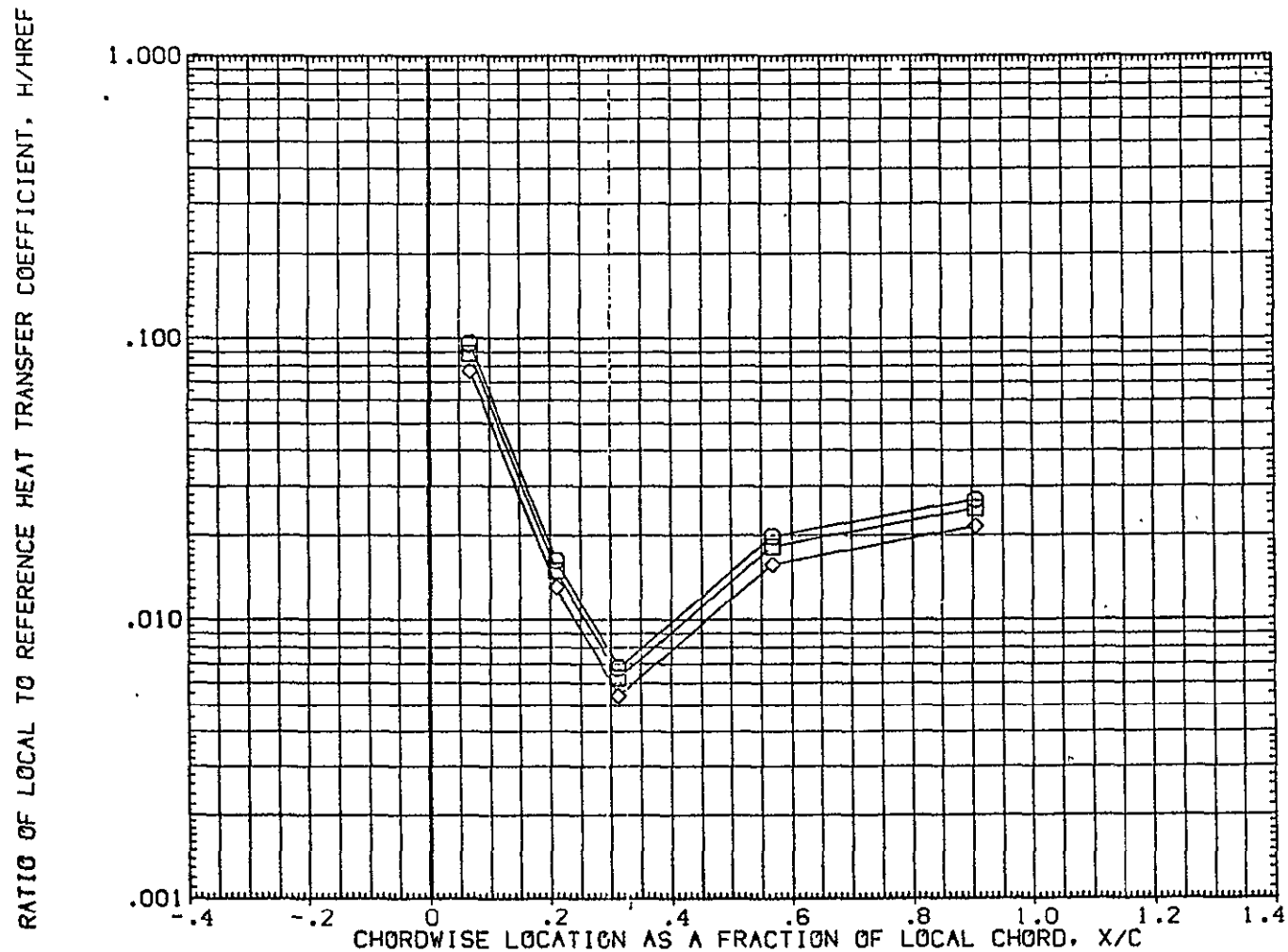


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	PACH	ALPHA	PARAMETRIC VALUES	BETA	
○	.850	.500	7.616				
□	.900						
◇	1.000						

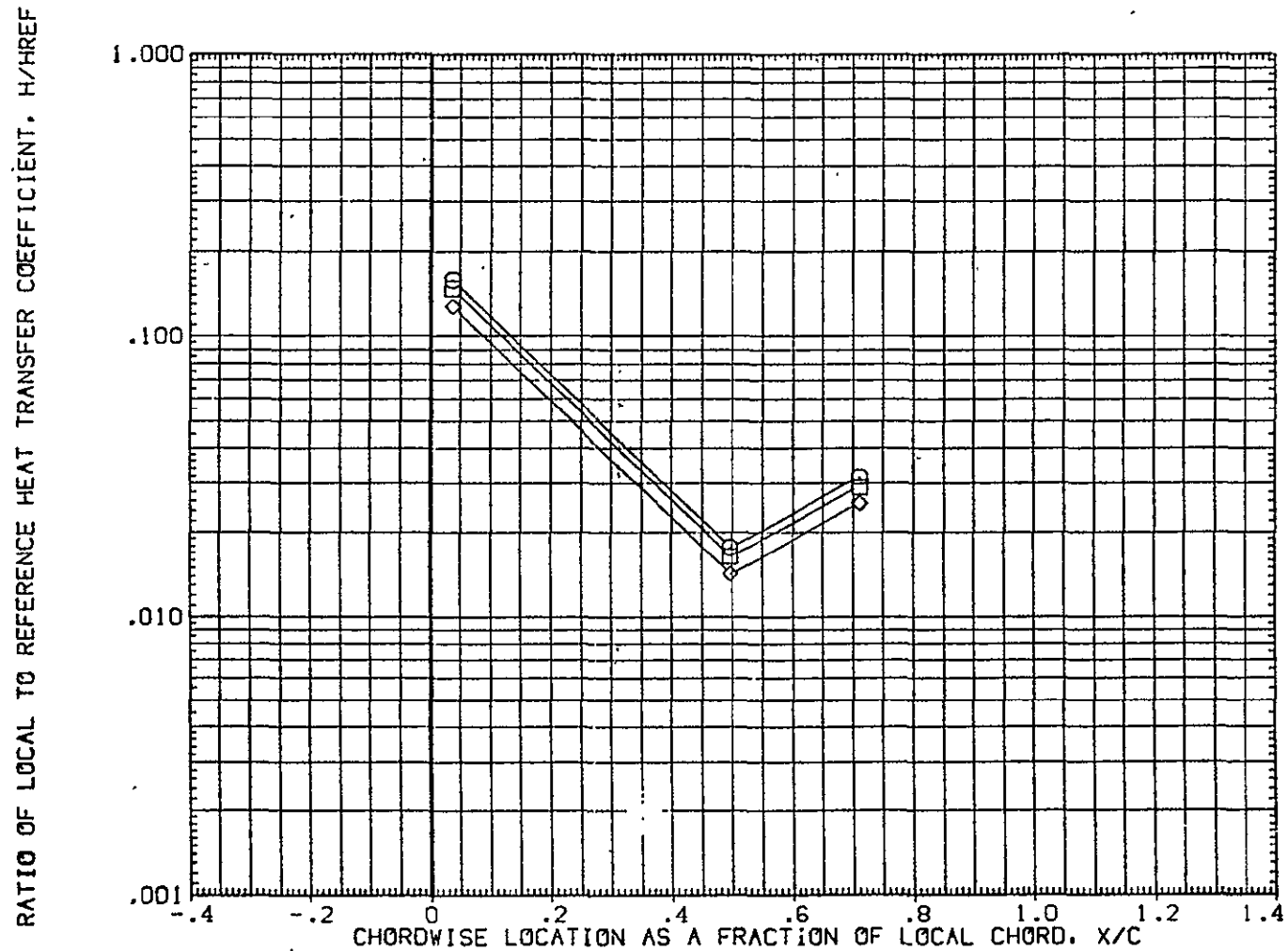


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	.600	7.616	.000		
◇	.900					
	1.000					

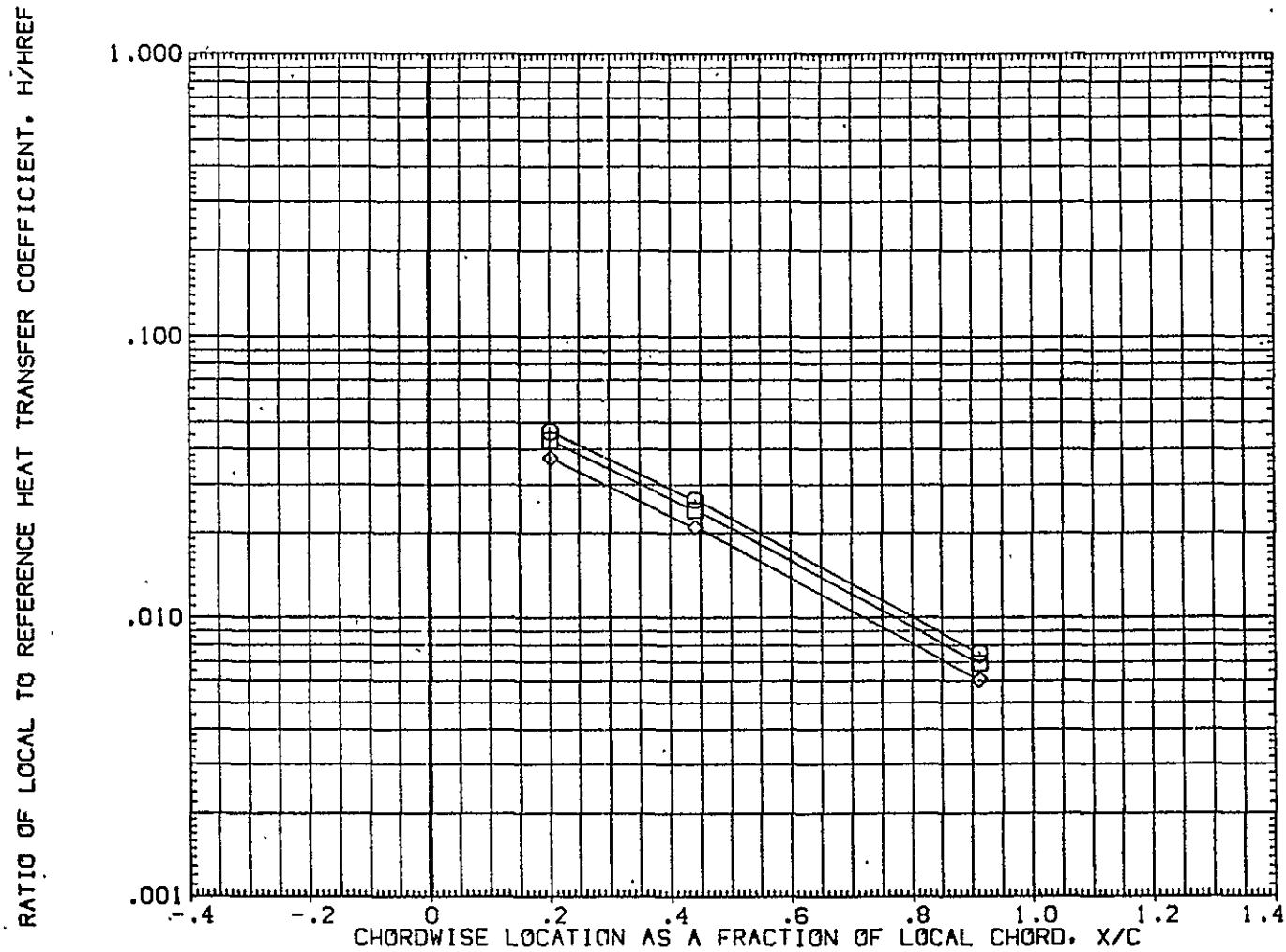


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
◇	.850	.750	7.616	ALPHA	.000	BETA
□	.900					.000
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

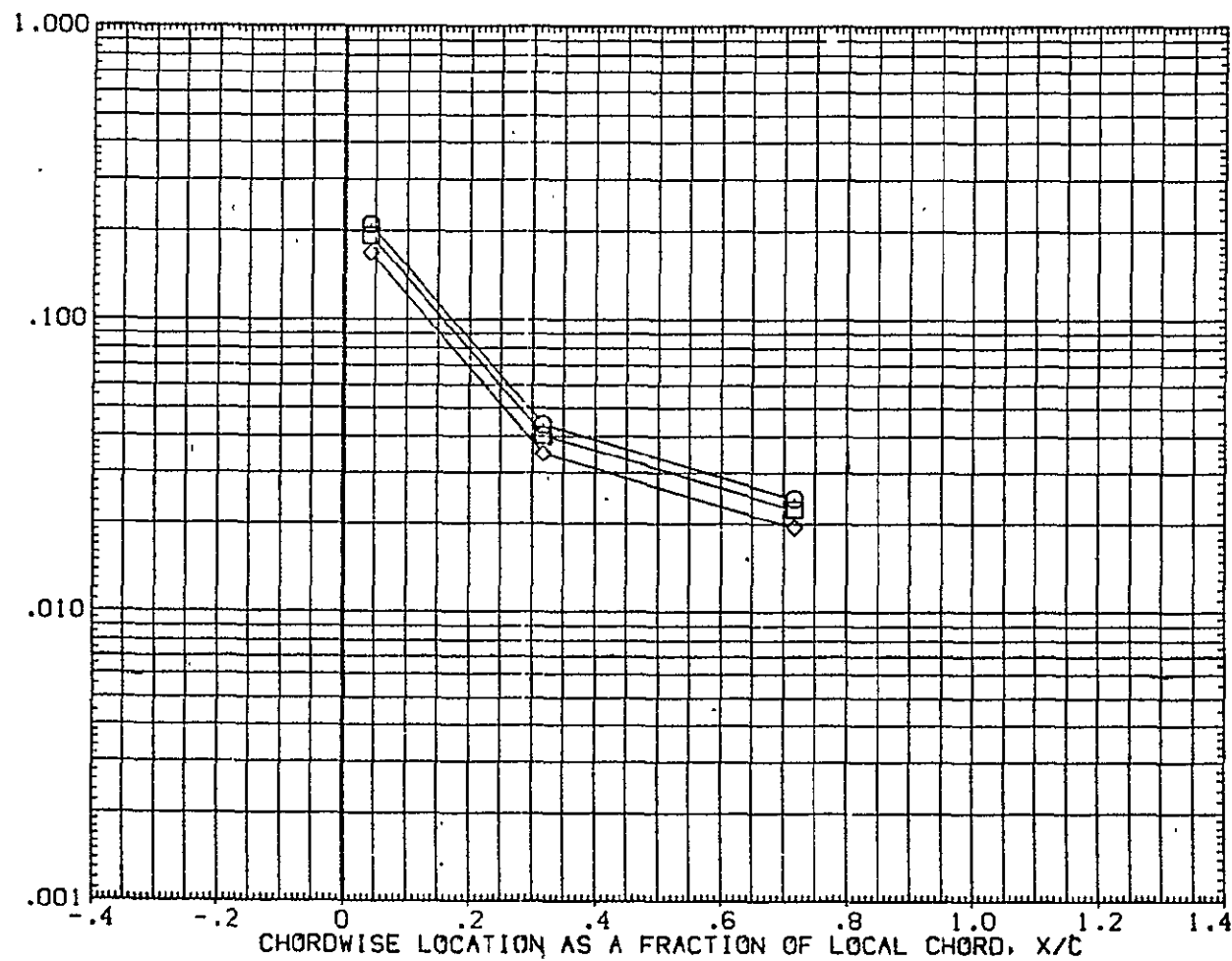


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	.950	7.616	.000		.000
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

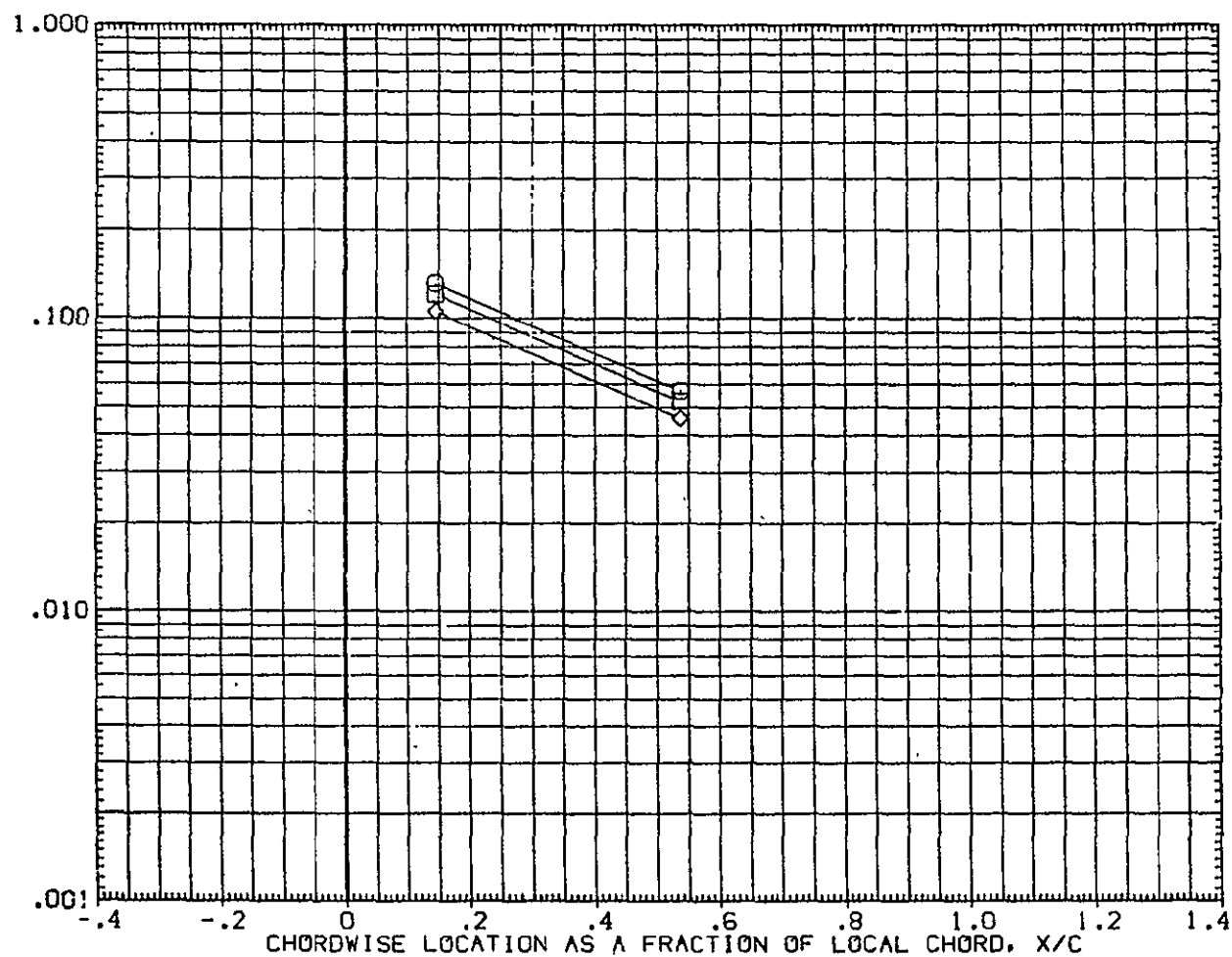


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
◇	.850	.250	18.330	ALPHA	.000	BETA
□	.900					.000
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

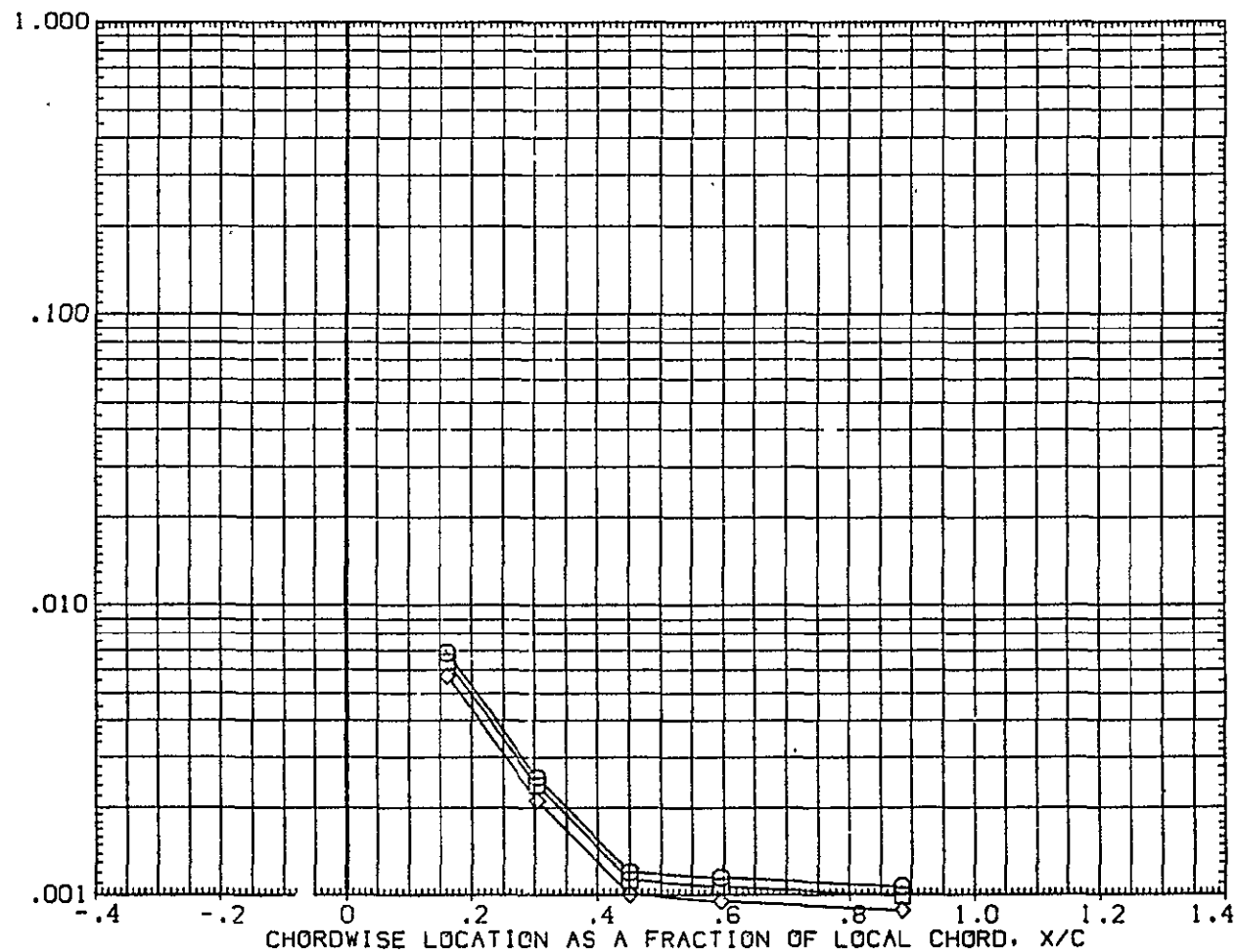


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	ZY/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	.400	18.330	.000	.000	.000
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

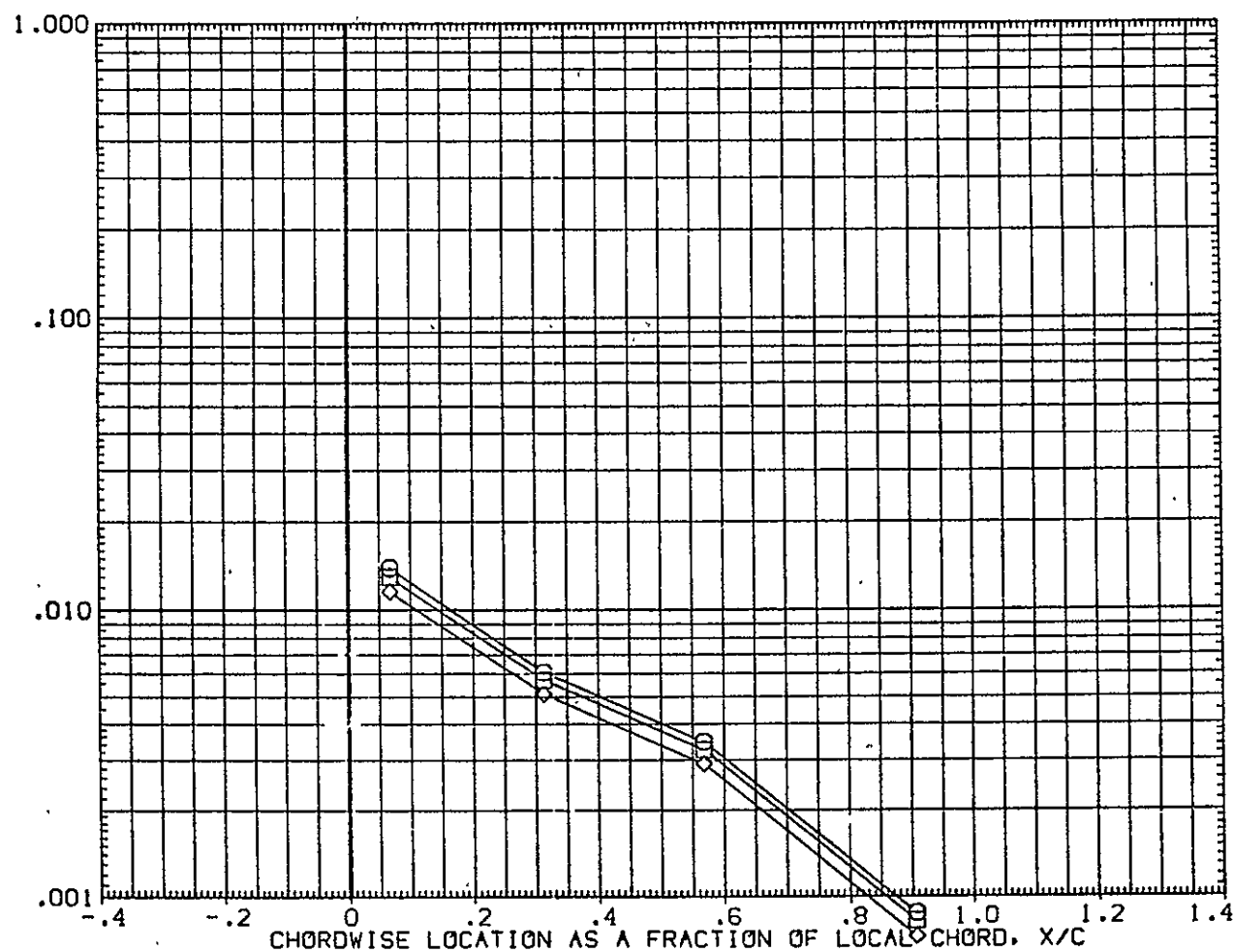


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	ZY/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	.500	18.330	.000	.000	.000
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

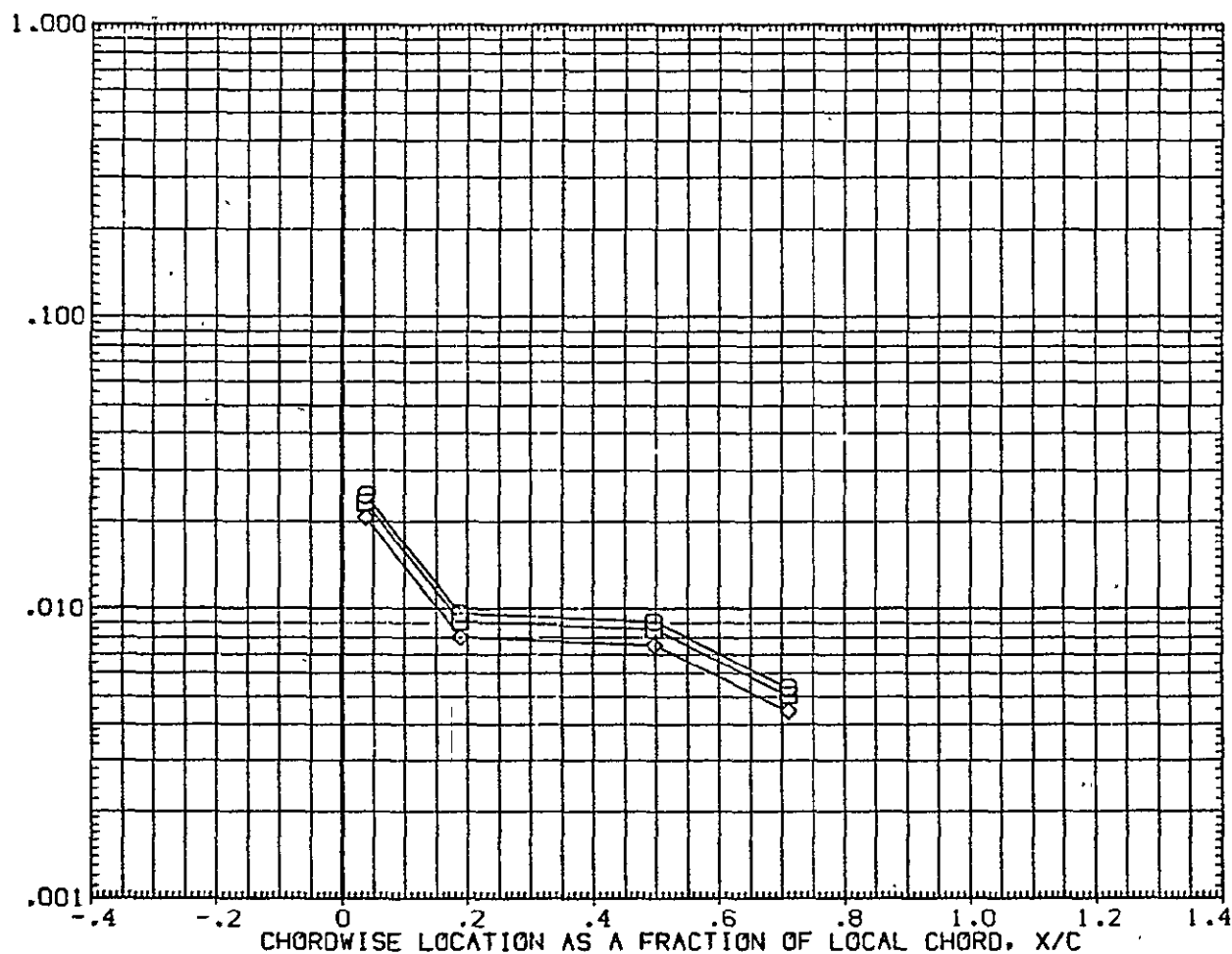


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
◇ □ ○	.850	.600	18.330	ALPHA	.000	BETA .000
	.900					
	1.000					

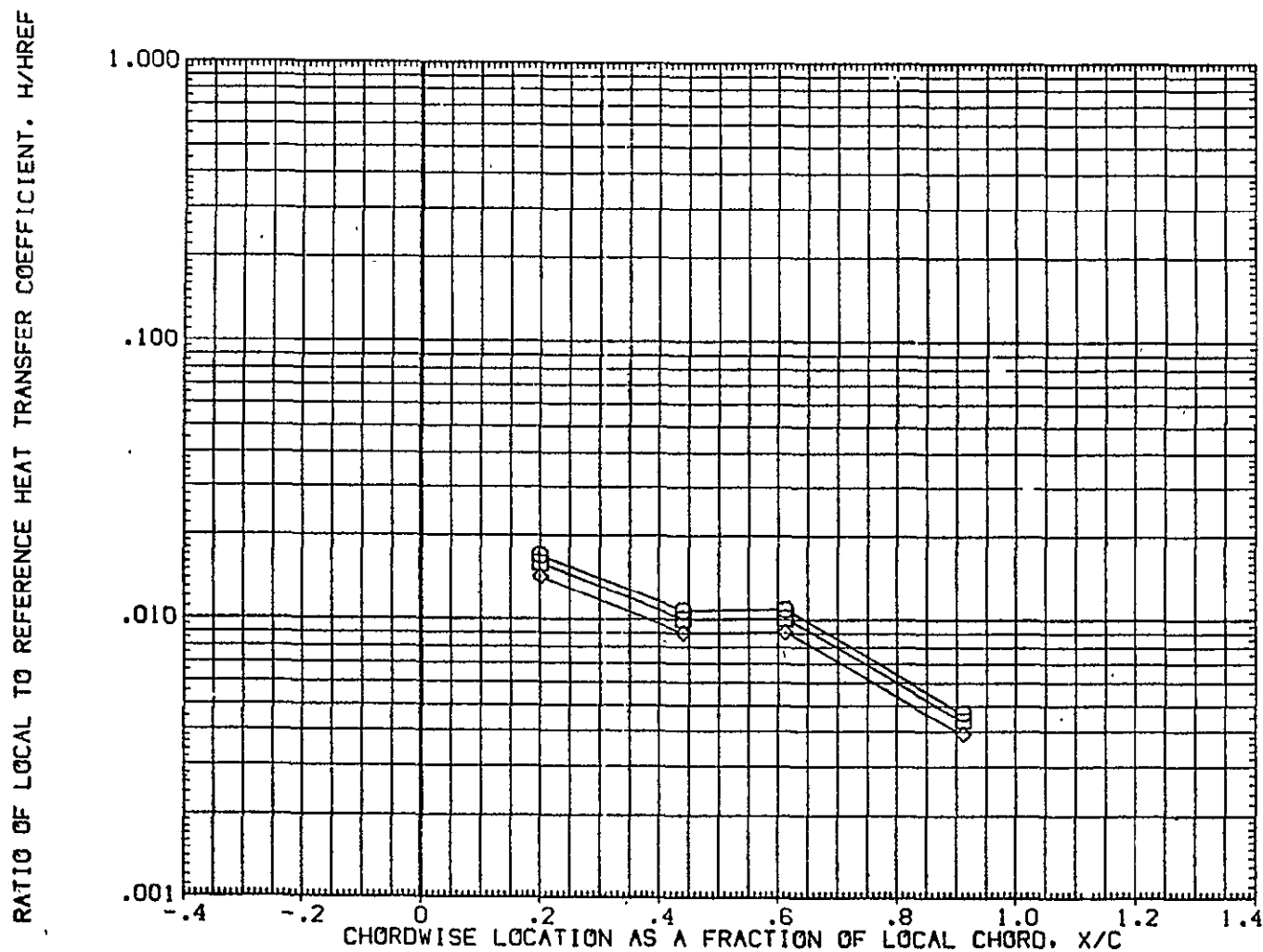


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
○	.850	.750	18.330	ALPHA	.000	BETA
□	.900					.000
◇	1.000					

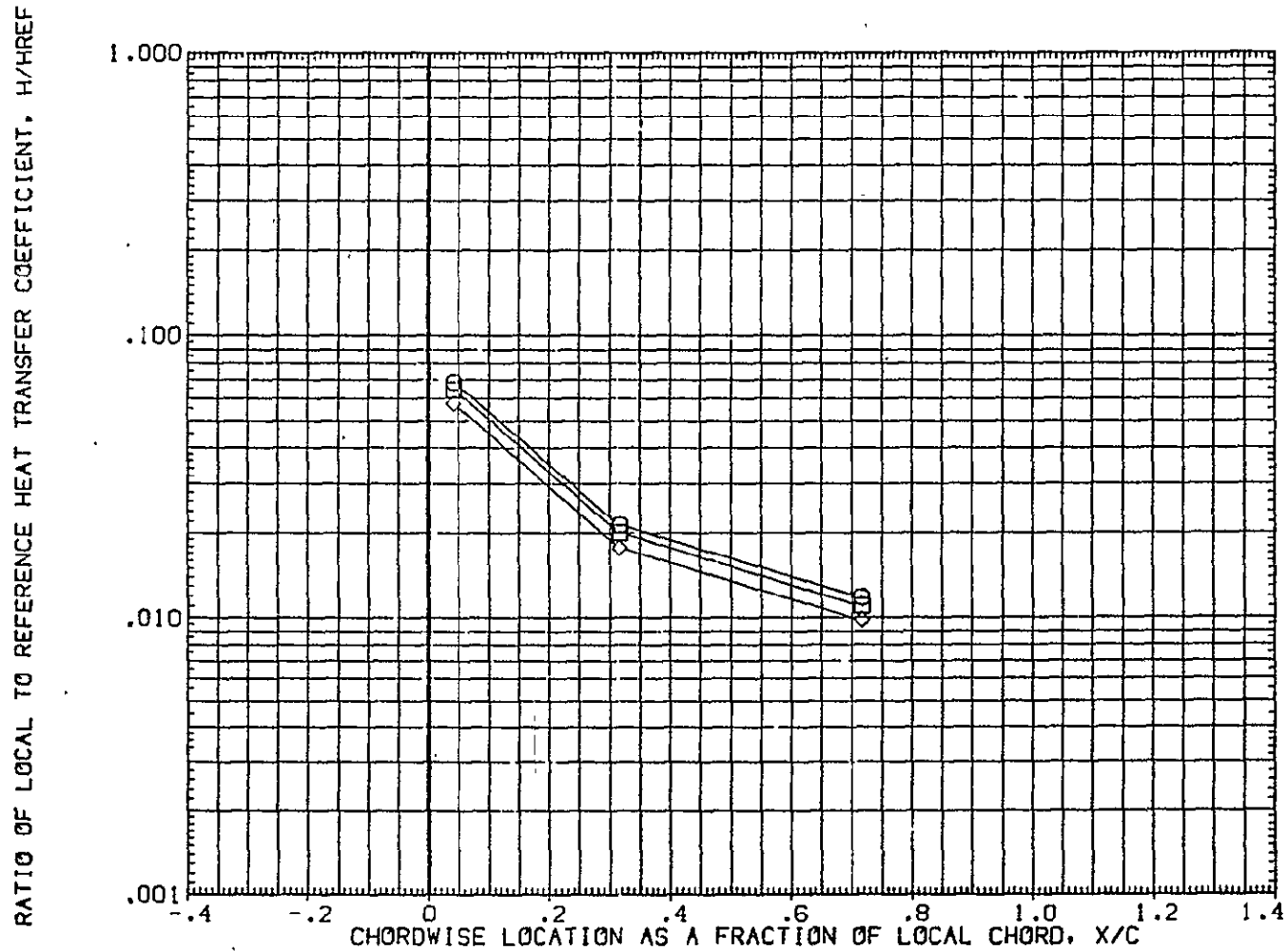


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 ° T WING L.S.(RUGW05)

SYMBOL	HAY/HT	2Y/B	MACH	ALPHA	PARAMETRIC VALUES	
○	.850	.950	18.330		.000	BETA
□	.900					.000
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

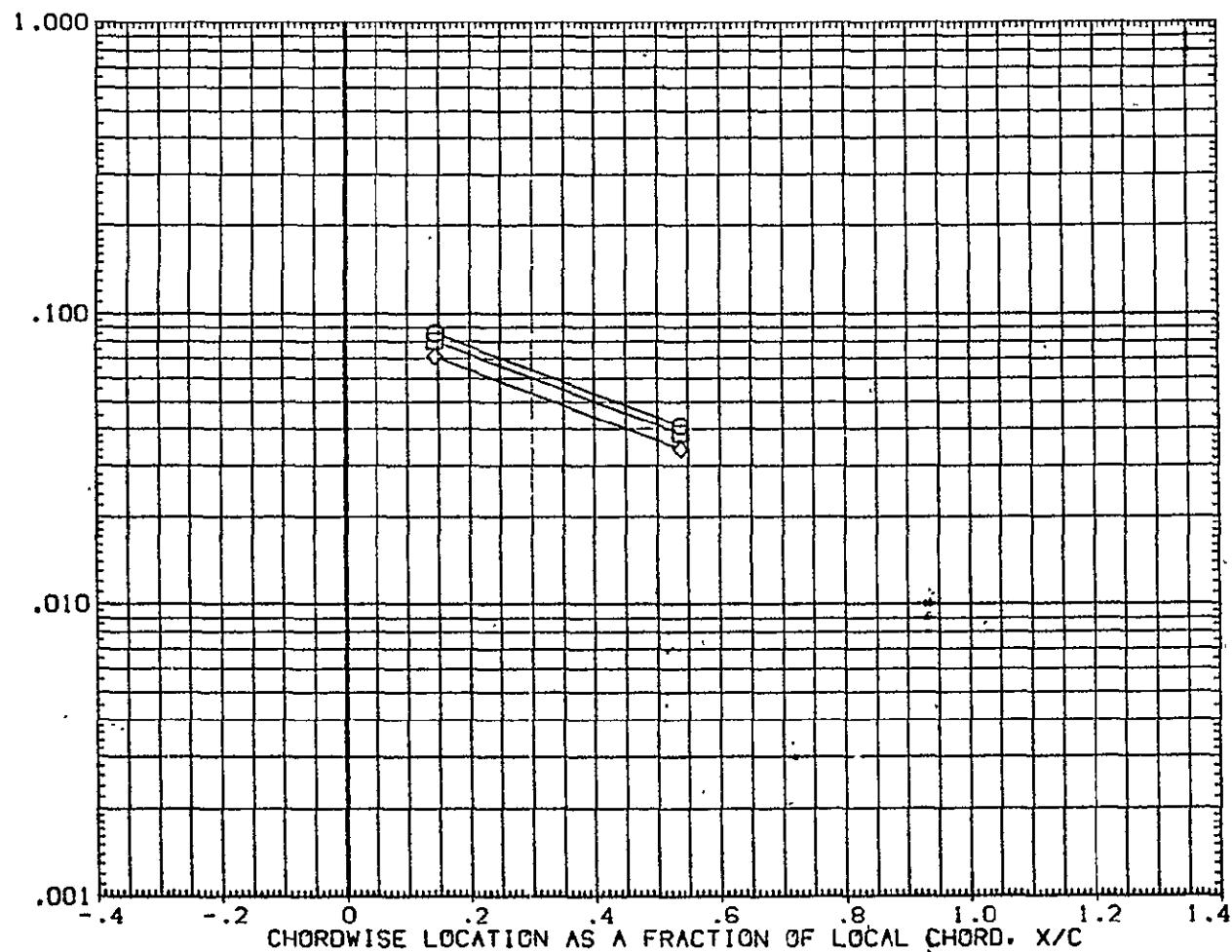


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	ALPHA	PARAMETRIC VALUES	BETA	.000
○	.850	.250	19.200				
□	.900						
◇	1.000						

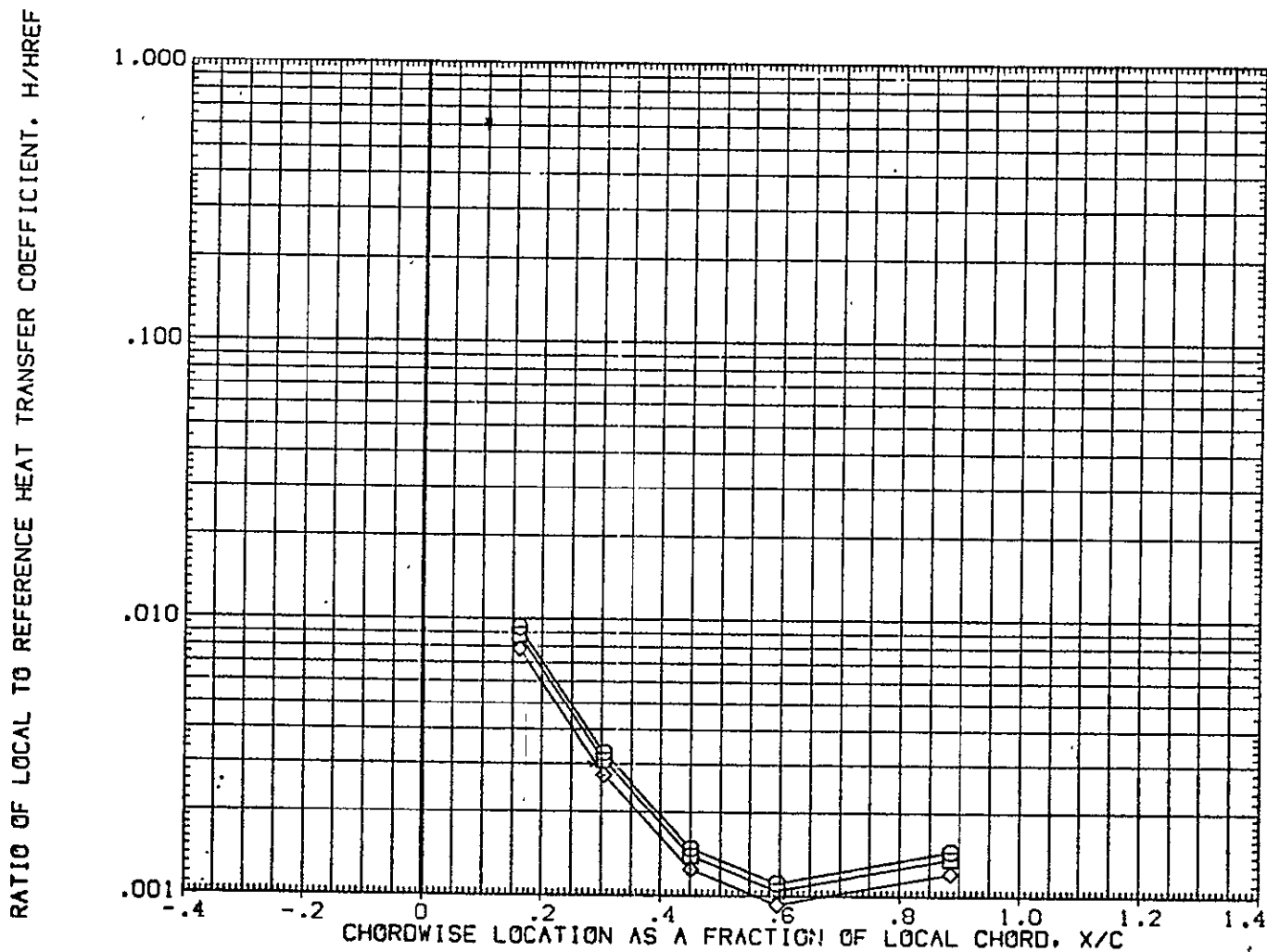


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR.

0H12/1H21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	.400	19.200	.000	.000	.000
□	.900					
◇	1.000					

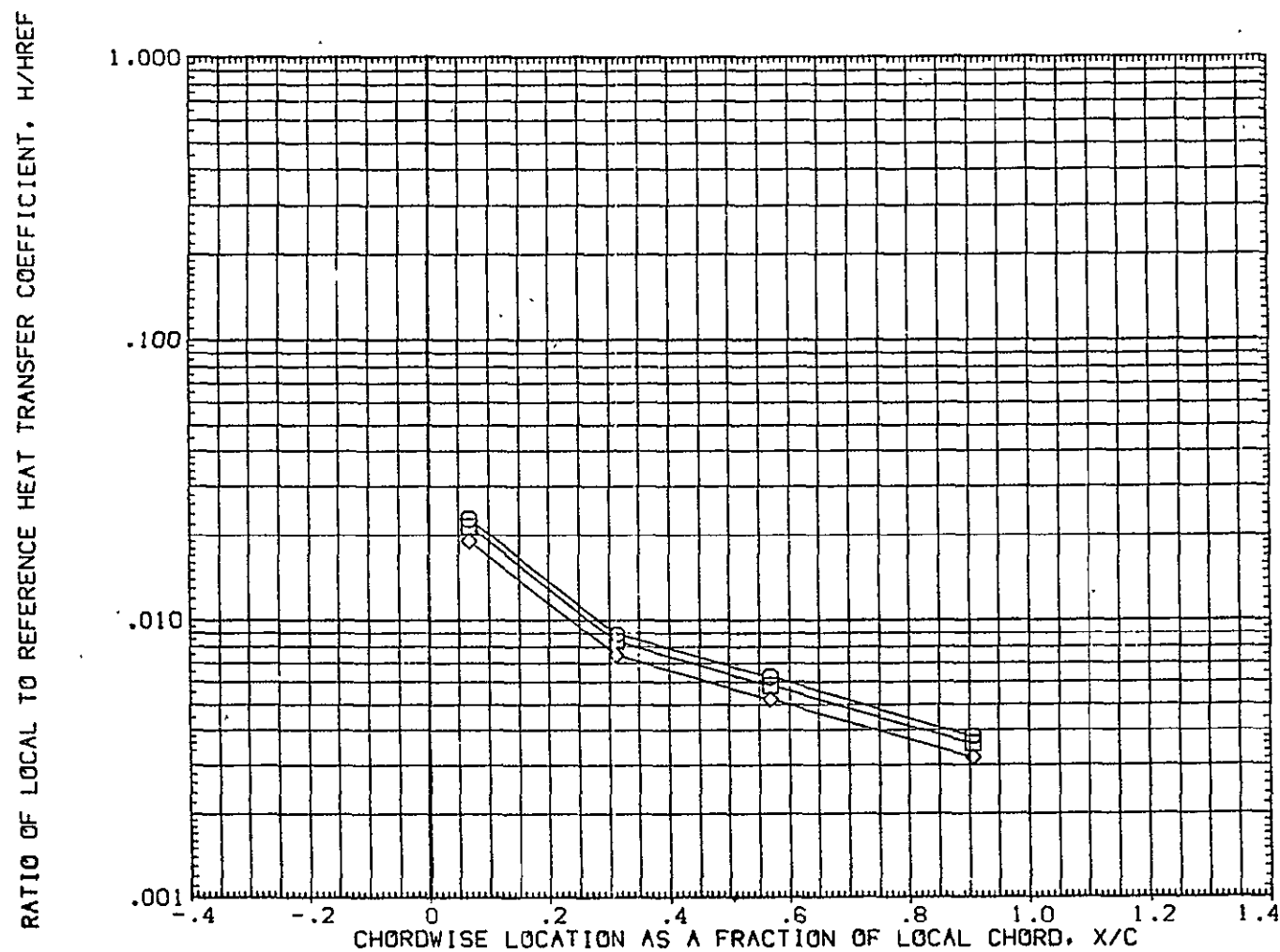


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

0H12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	ALPHA	PARAMETRIC VALUES	
○	.850	.500	19.200	.000	BETA	.000
□	.900					
◇	1.000					

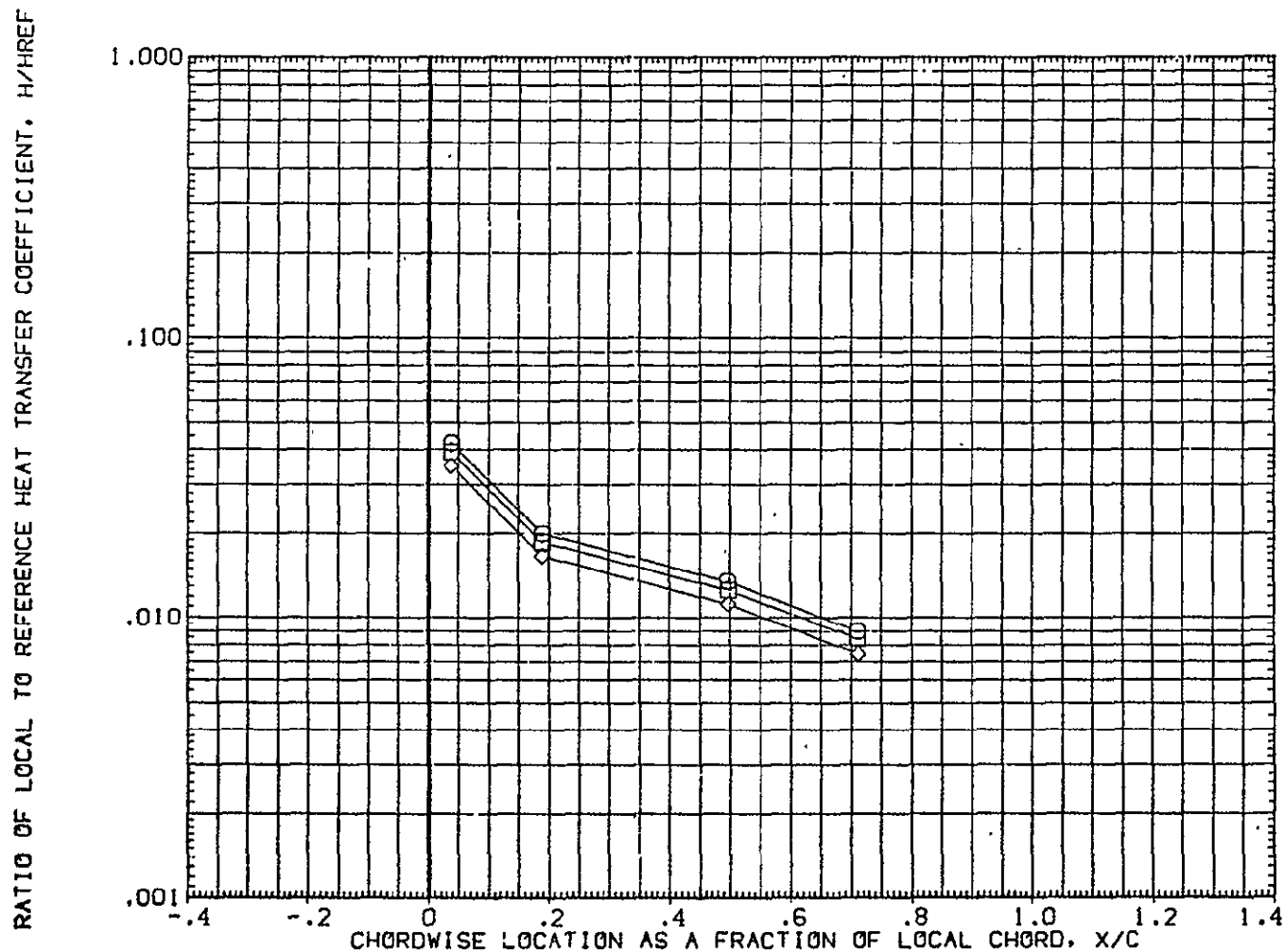


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.857	.600	19.200	.000		.000
◇	.900					
	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

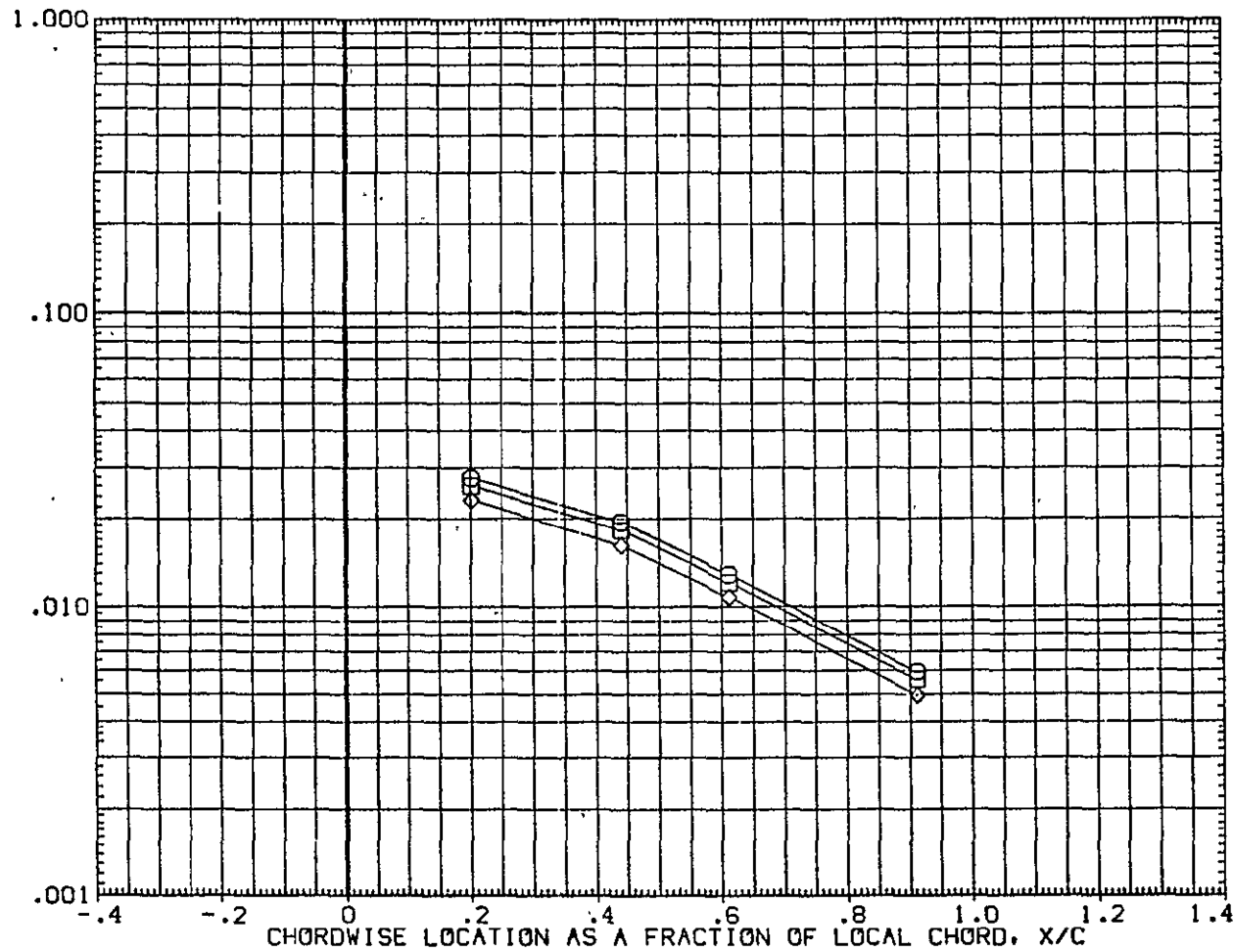


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST I73-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.950	.750	19.200	.000		
□	.900					
◇	1.000					

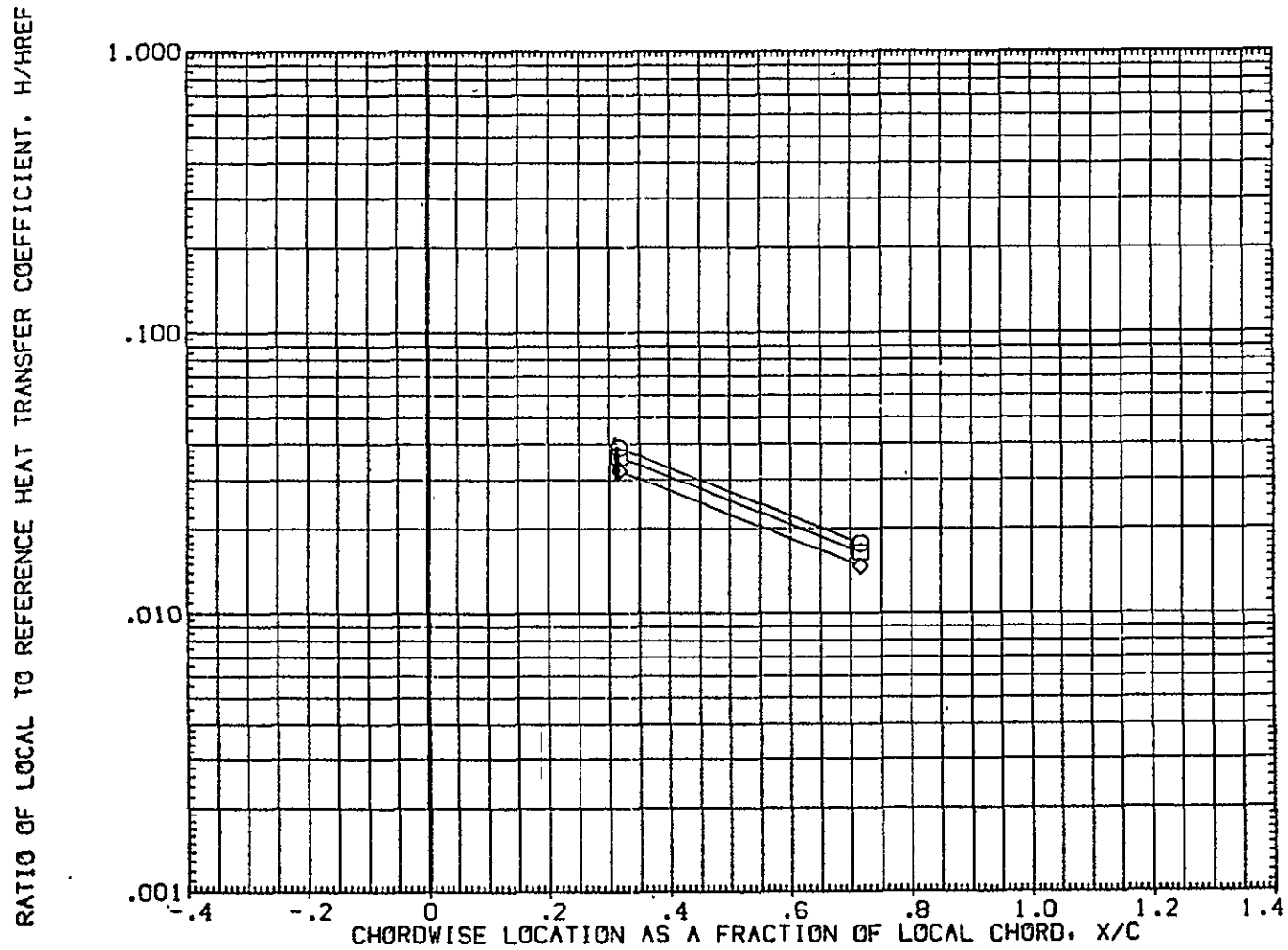


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

0H12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW05)

SYMBOL	HAW/HT	ZY/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	.950	19.200	.000		
◇	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

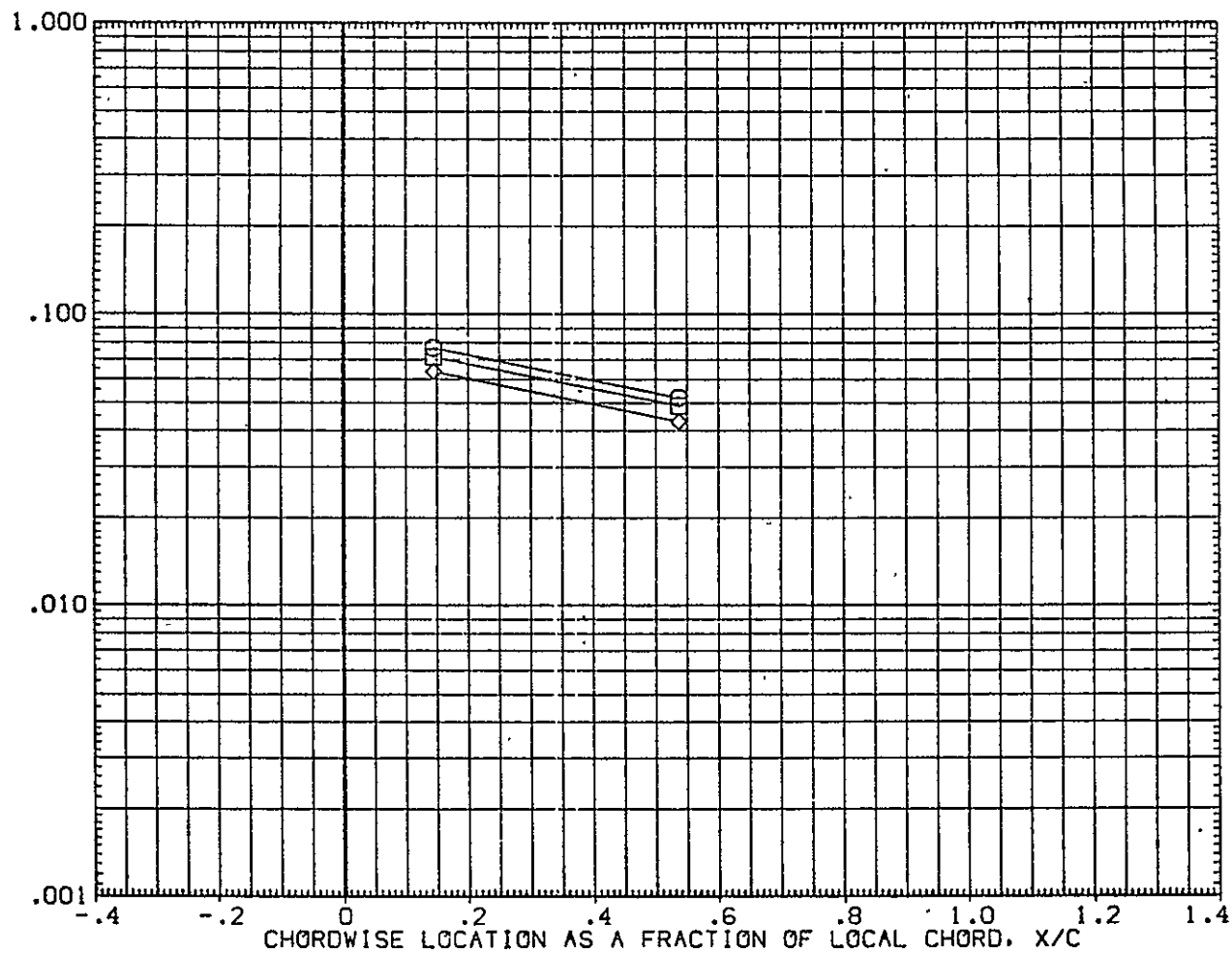


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/O(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
O	.900	.250	7.000	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

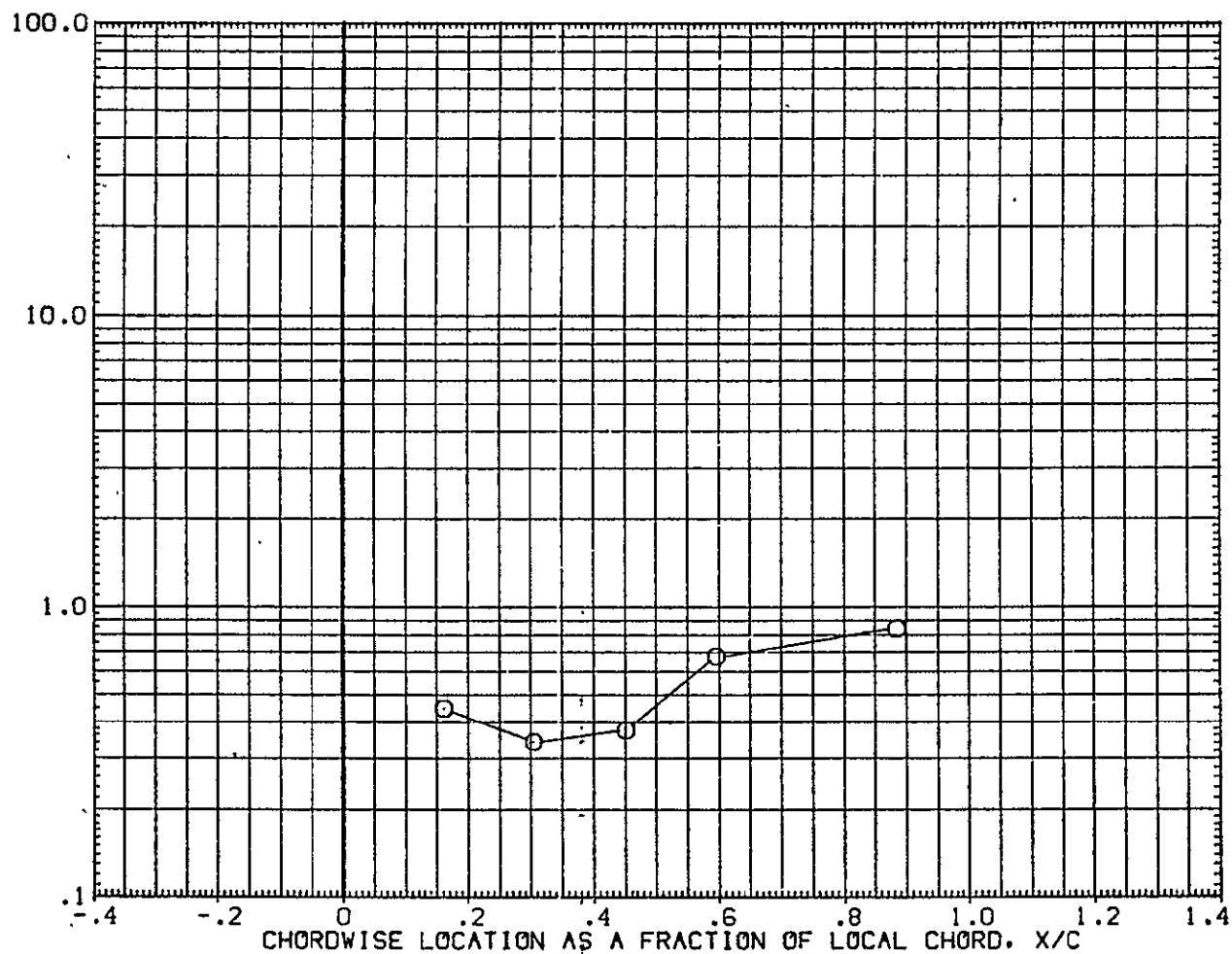


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

0H12 + 1H21 MODEL 37 0T(05)/0(07) WING L.S. (1UGW05)

SYMBOL
O
HAW/HT
.900
2Y/B
.400
MACH
7.000

PARAMETRIC VALUES
ALPHA
.000
BETA
.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

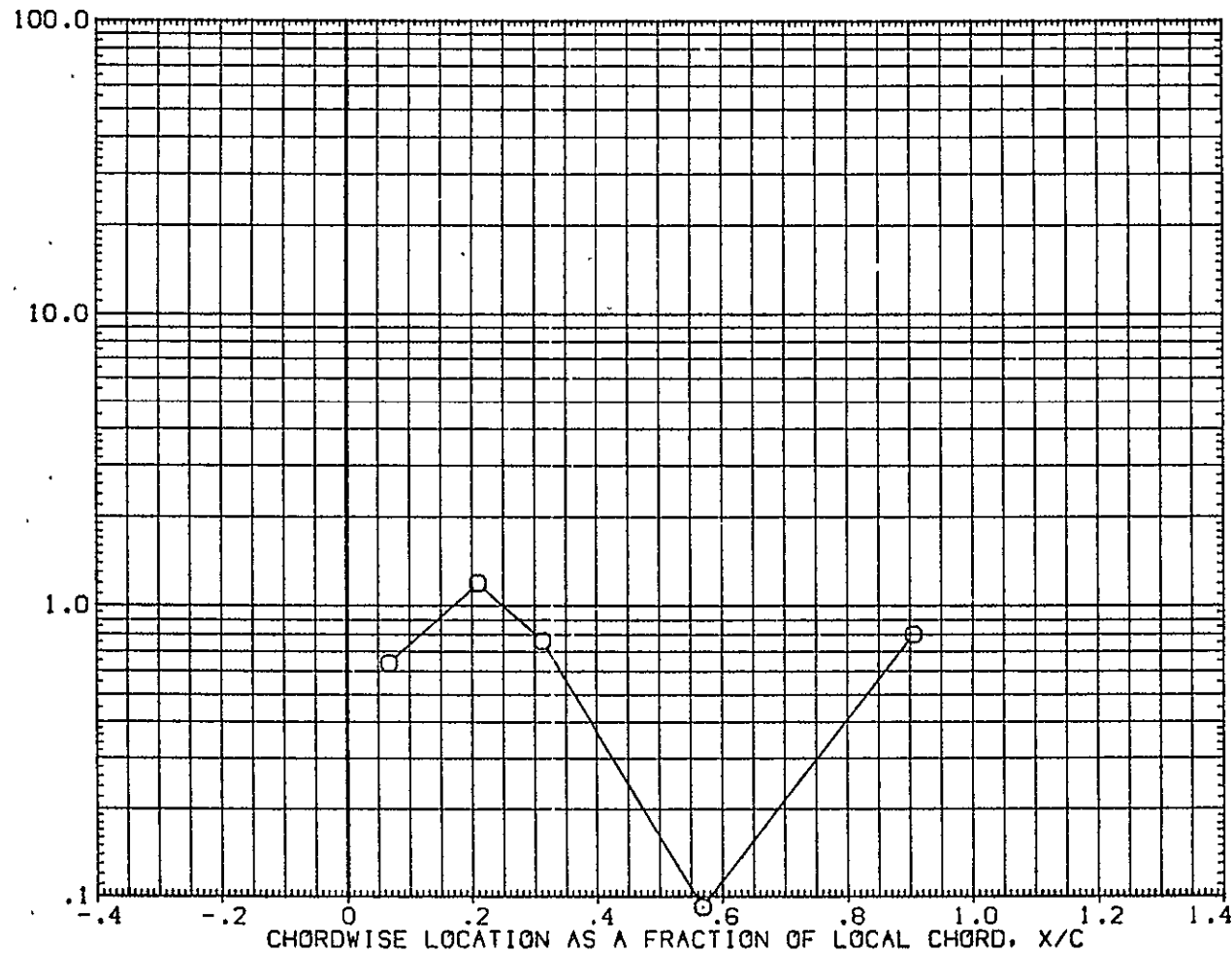


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/O(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	ALPHA	PARAMETRIC VALUES	BETA	
O	.900	.500	7.000		.000	.000	

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

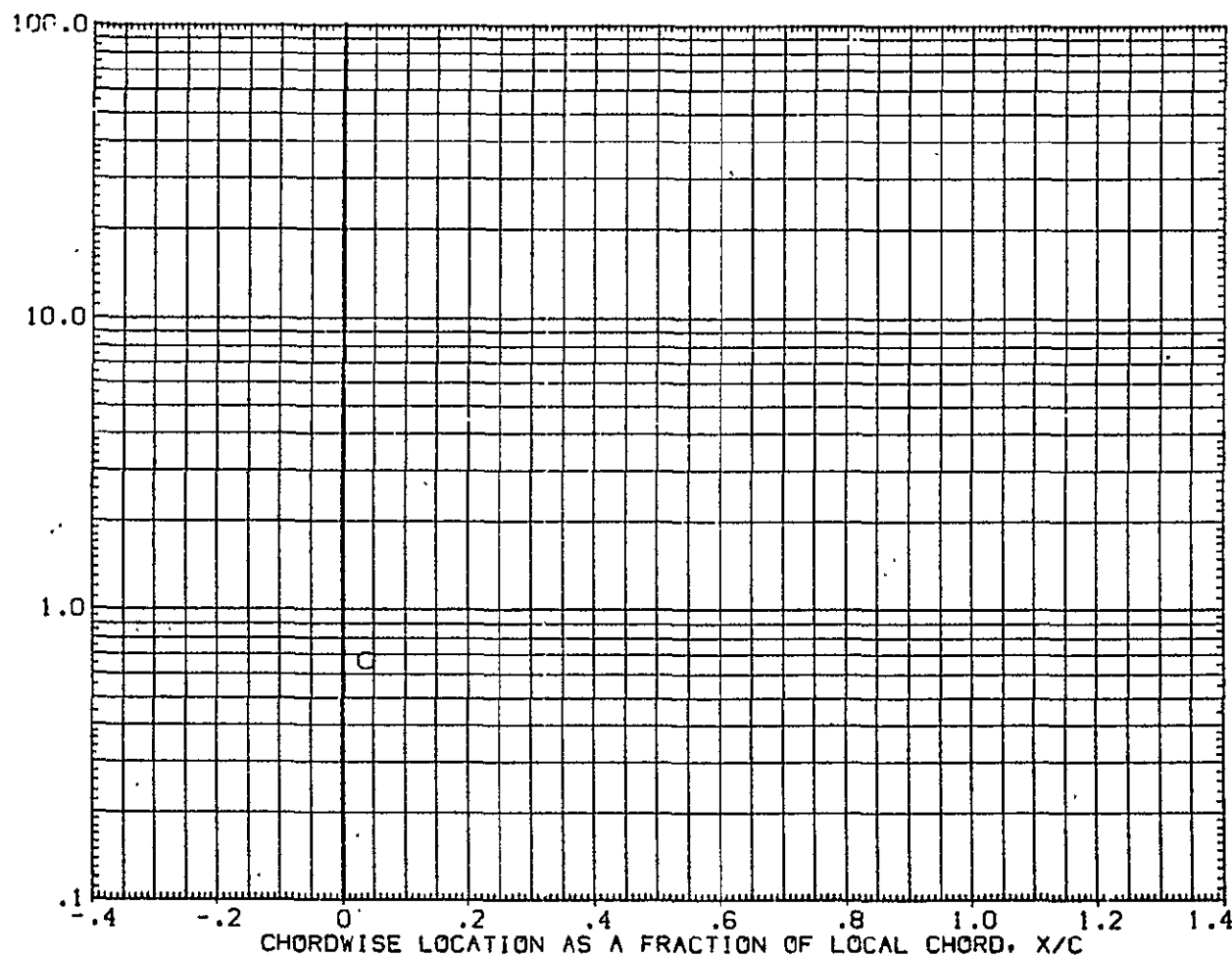


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 0T(05)/0(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES
○	.900	.600	7.000	ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

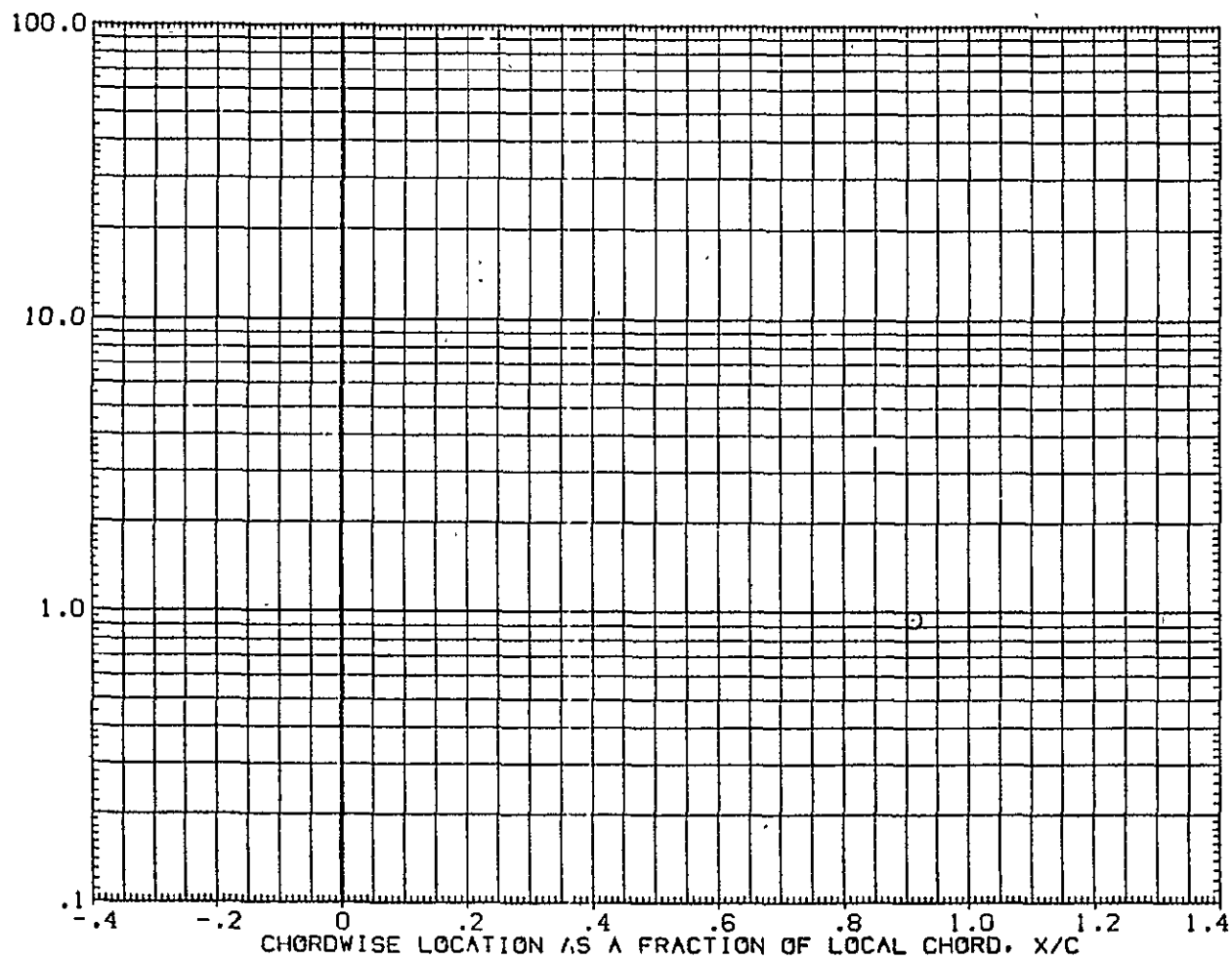


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/O(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	ALPHA	PARAMETRIC VALUES	BETA	
O	.900	.750	7.000		.000	.000	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

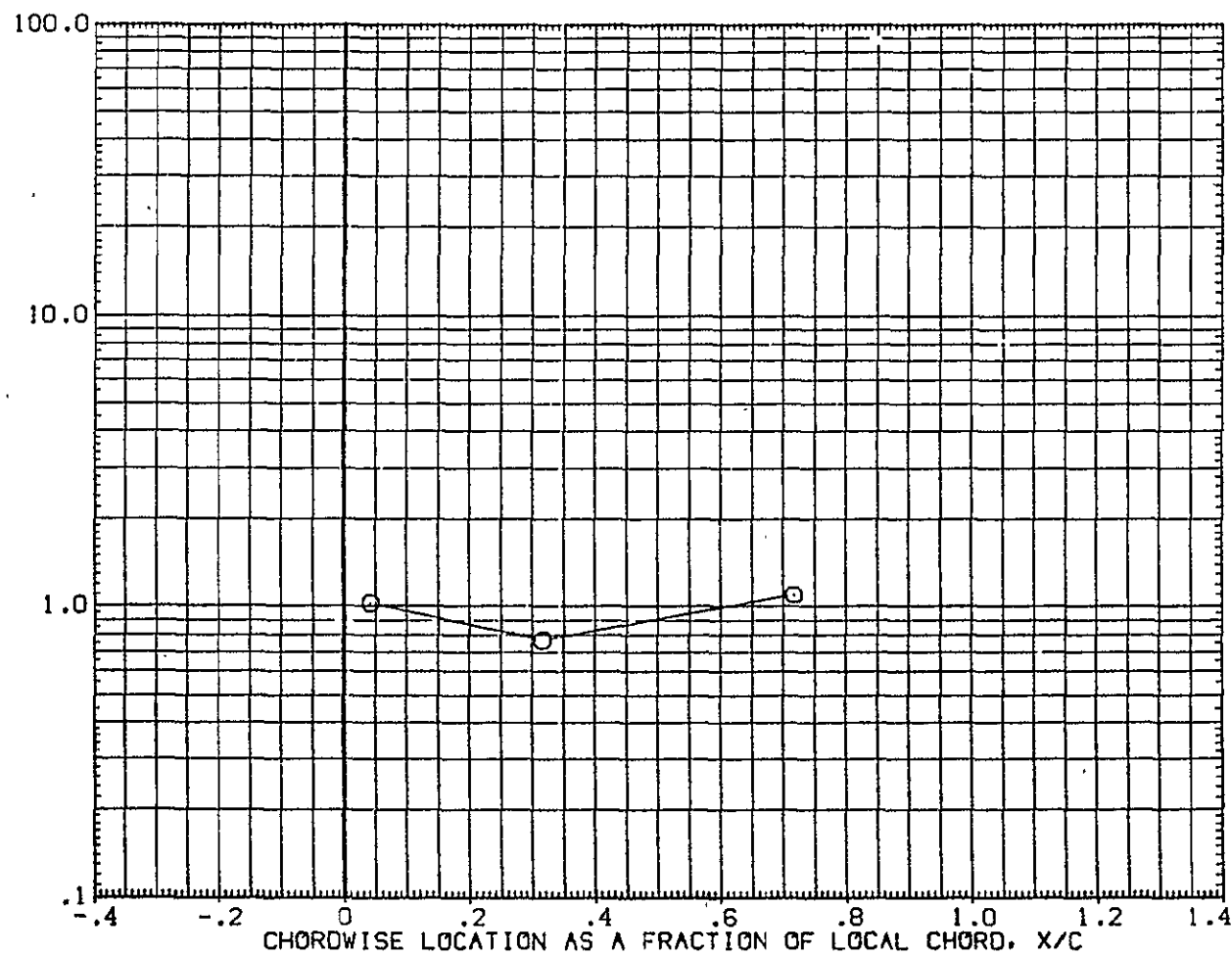


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12 + IH21 MODEL 37 OT(05)/O(07) WING L.S. (UGW05)

SYMBOL
O

HAW/HT
.900

2Y/B
.950

MACH
7.000

PARAMETRIC VALUES
ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

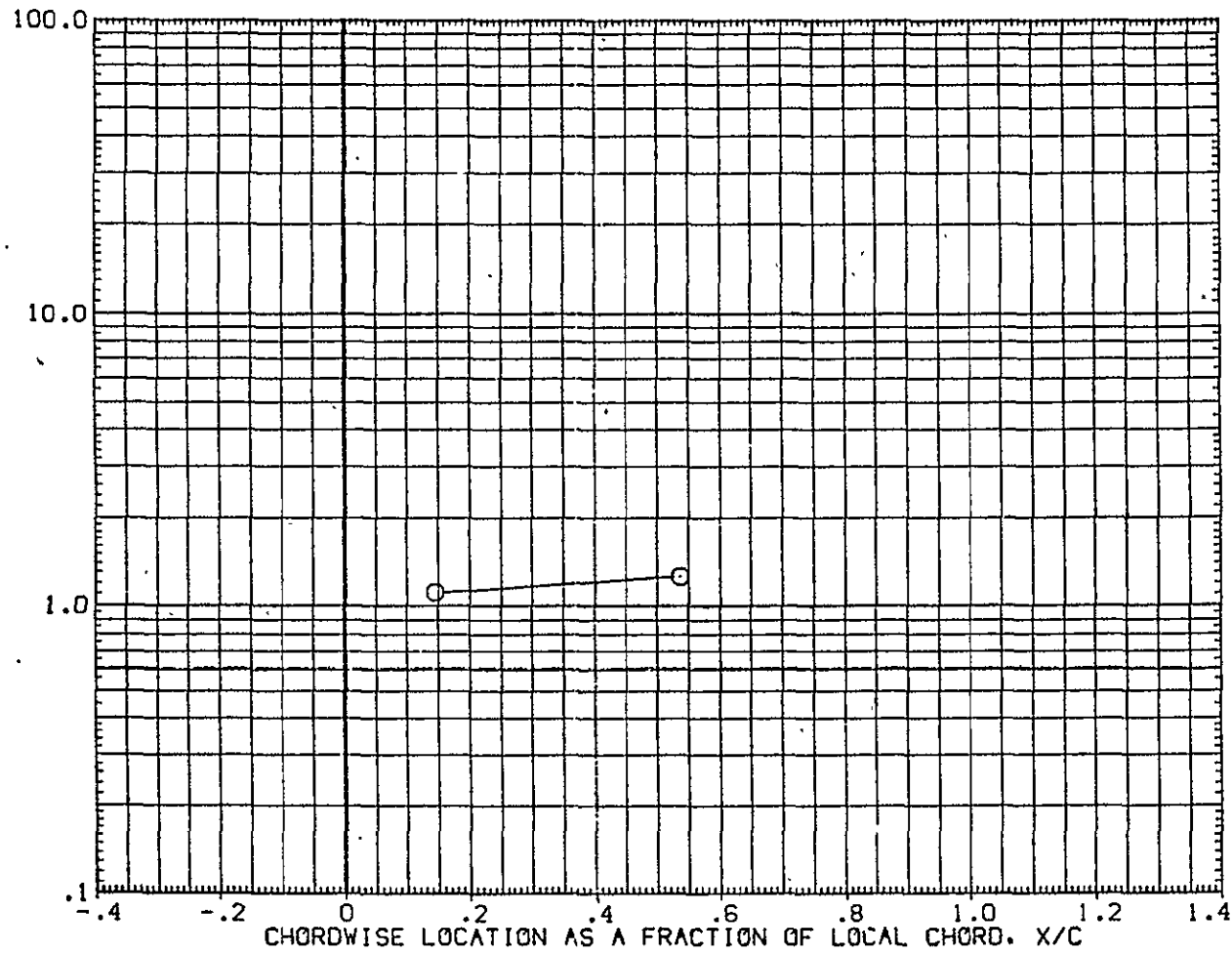


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

0H12 + 1H21 MODEL 37 0T(05)/0(07) WING L.S. (1UGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
○	.900	.250	7.610	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

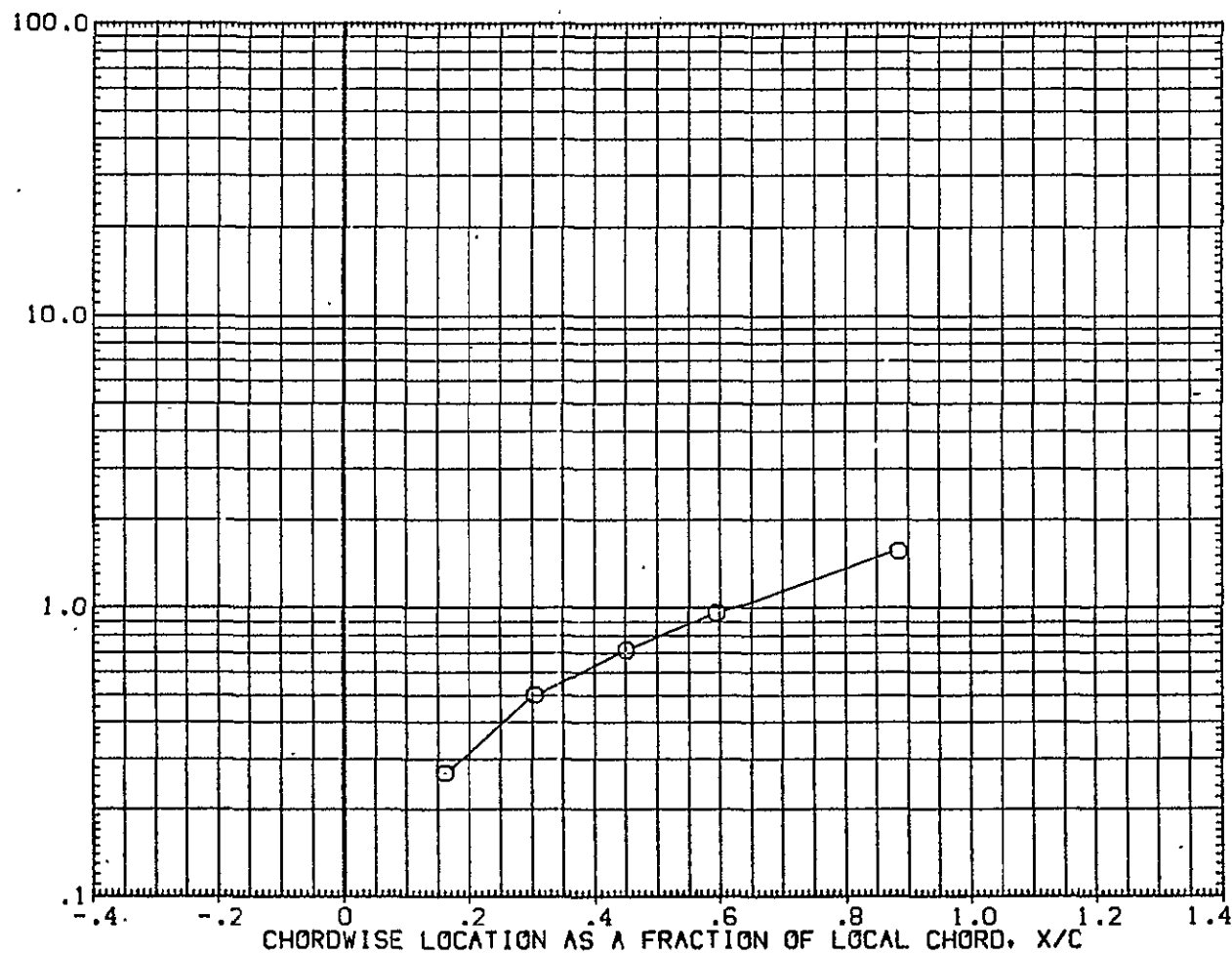


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0
PAGE 297

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

0H12 + IH21 MODEL 37 0T(05)/0(07) WING L.S. (IUGW05)

SYMBOL
O

HAW/HT
.900

ZY/B
.400

MACH
7.610

PARAMETRIC VALUES
ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

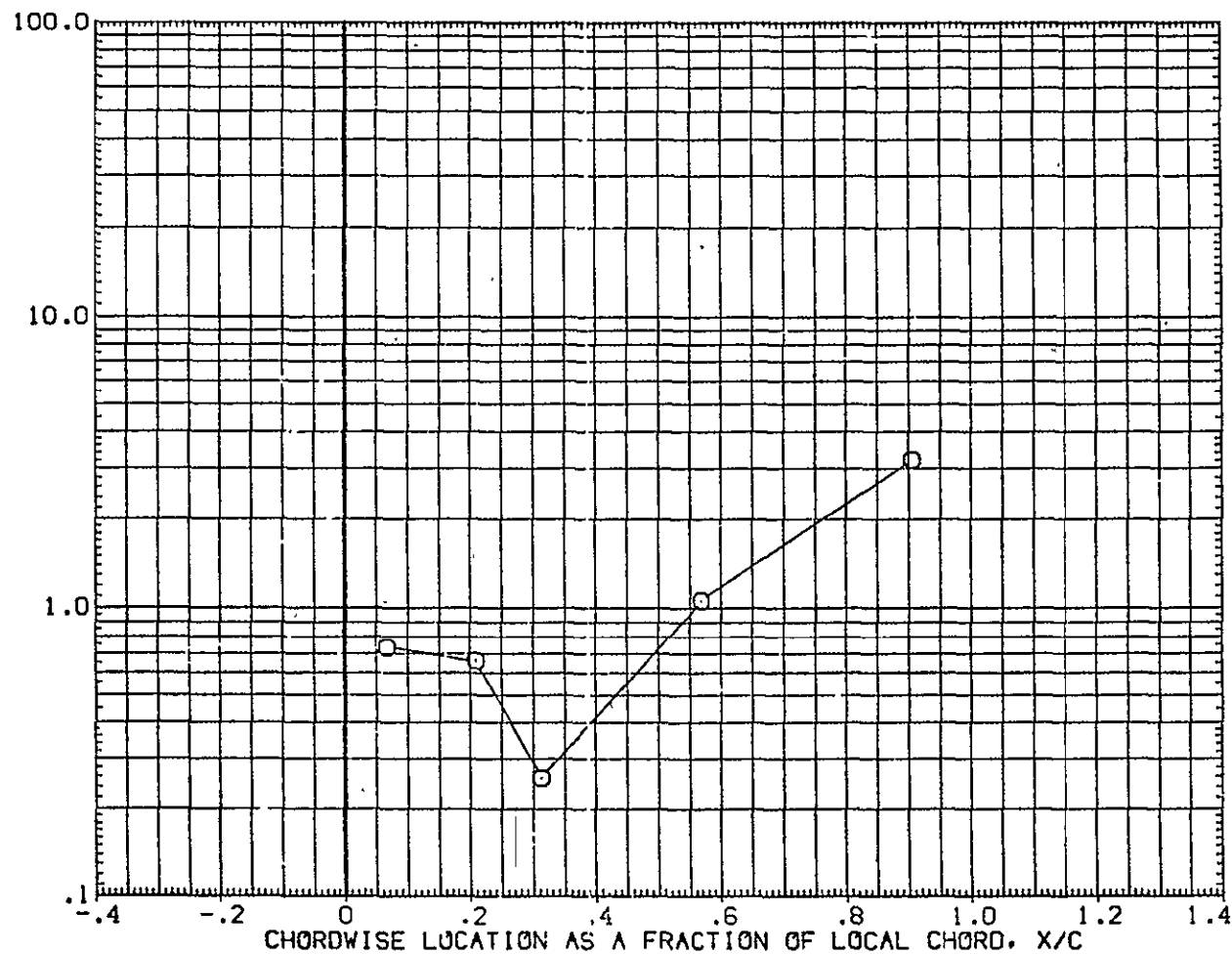


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/O(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
O	.900	.500	7.610	ALPHA	BETA	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

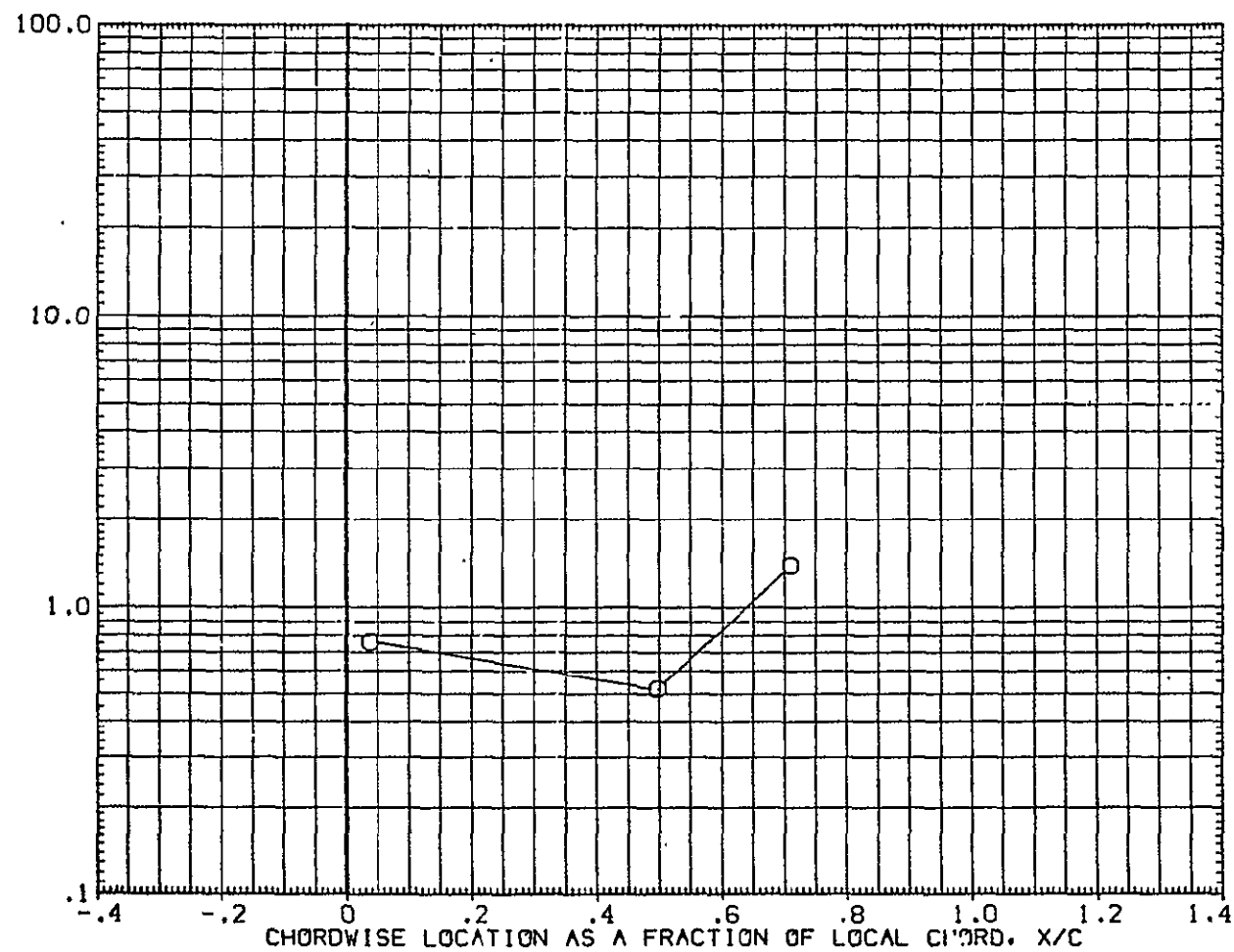


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/O(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	ALPHA	PARAMETRIC VALUES	BETA	
O	.900	.600	7.610		.000	.000	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

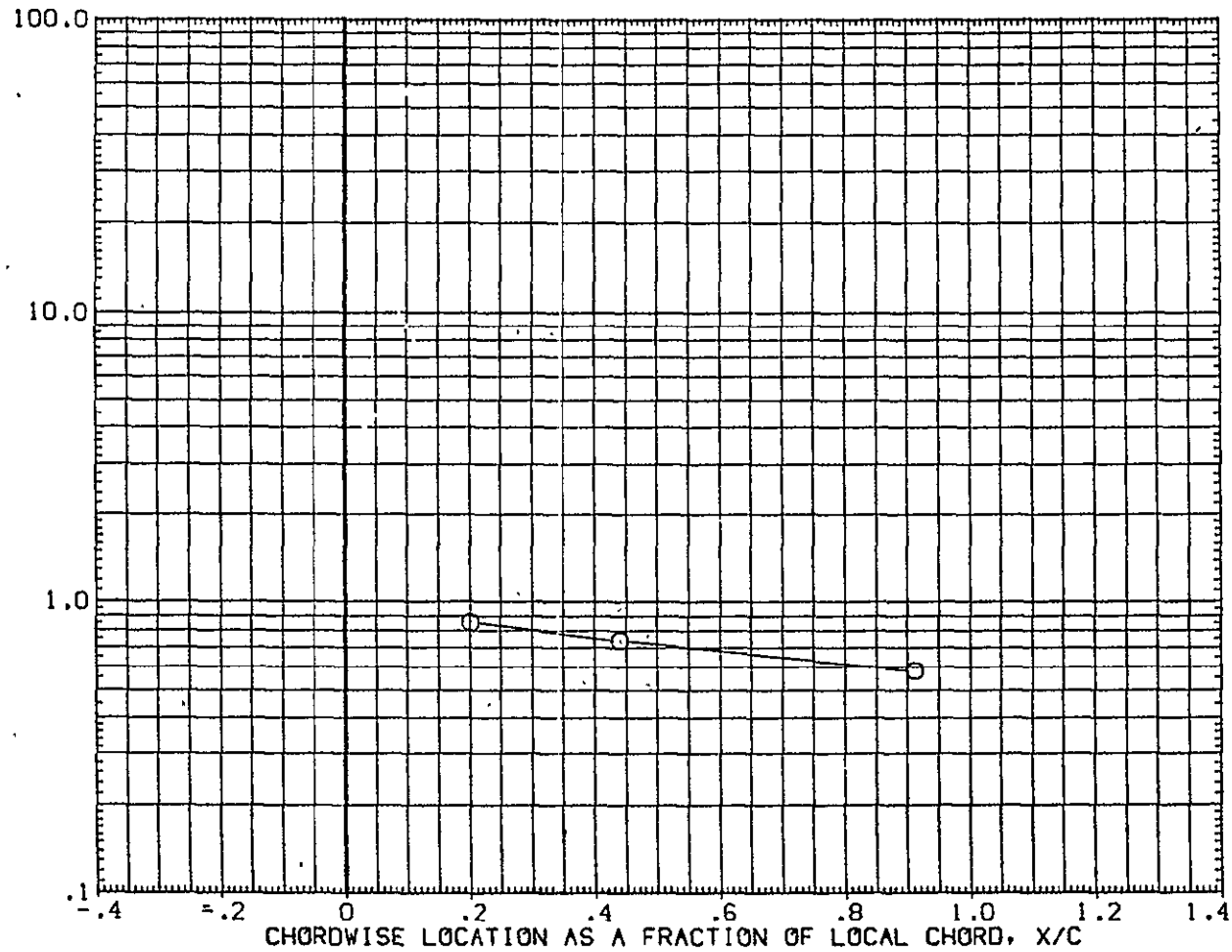


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

CH12 + IH21 MODEL 37 OT(05)/O(07) WING L.S. (IUGW05)

SYMBOL
O
HAW/HT
.900
2Y/B
.750
MACH
7.610

PARAMETRIC VALUES
ALPHA
.000
BETA
.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

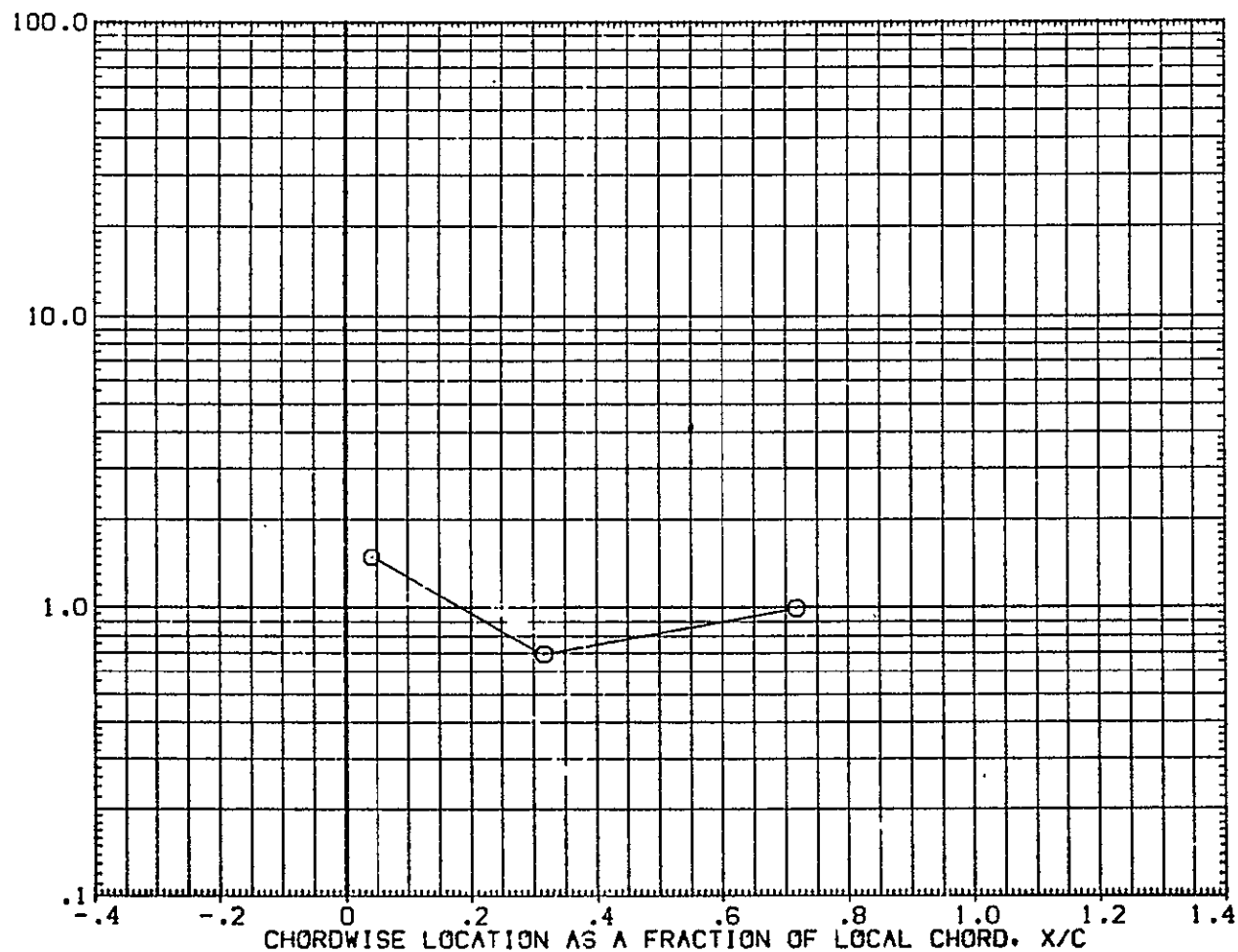


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 0T(05)/0(07) WING L.S. (JUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
O	.900	.950	7.610	ALPHA	.000	PETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

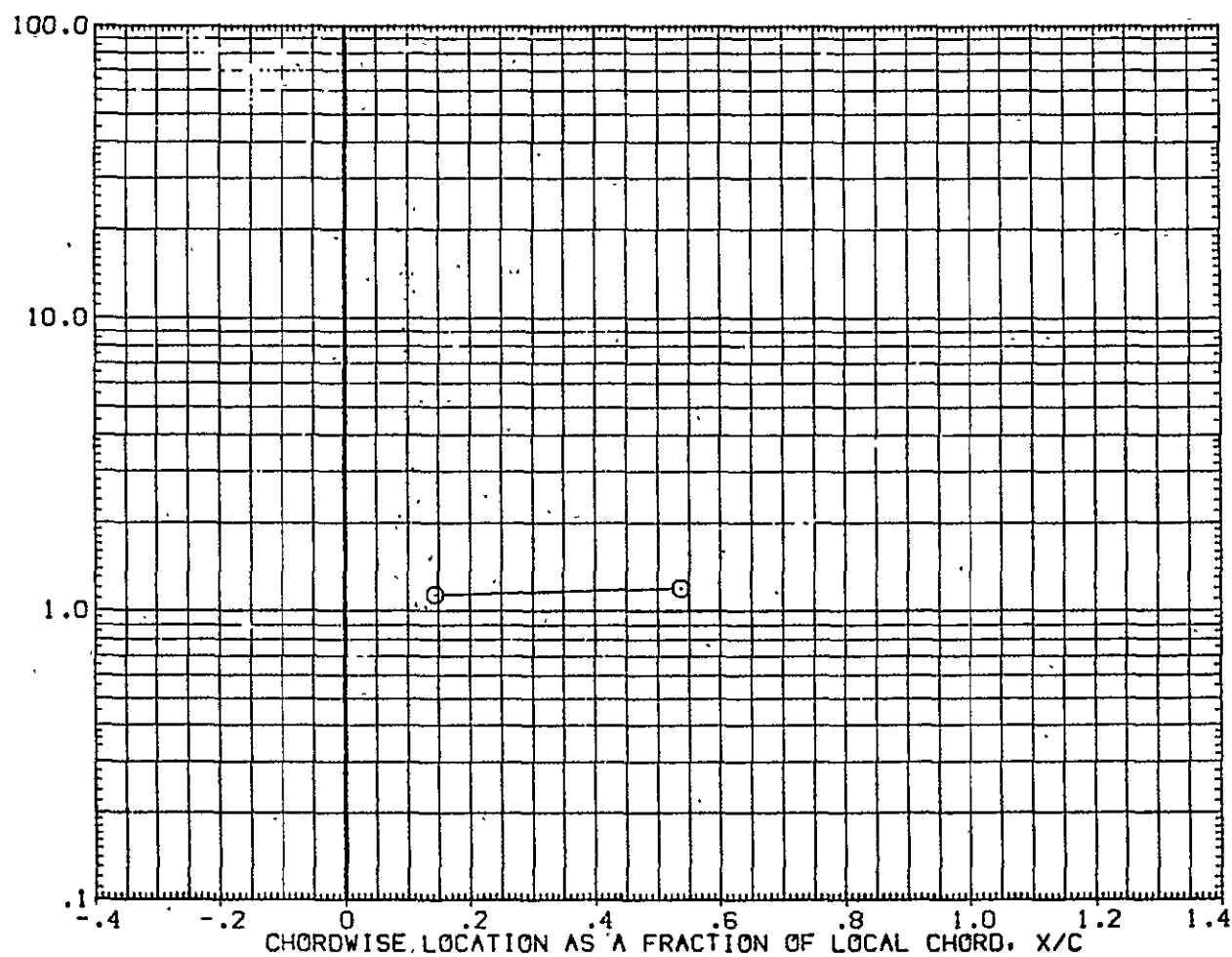


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/O(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
C	.900	.250	18.300	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

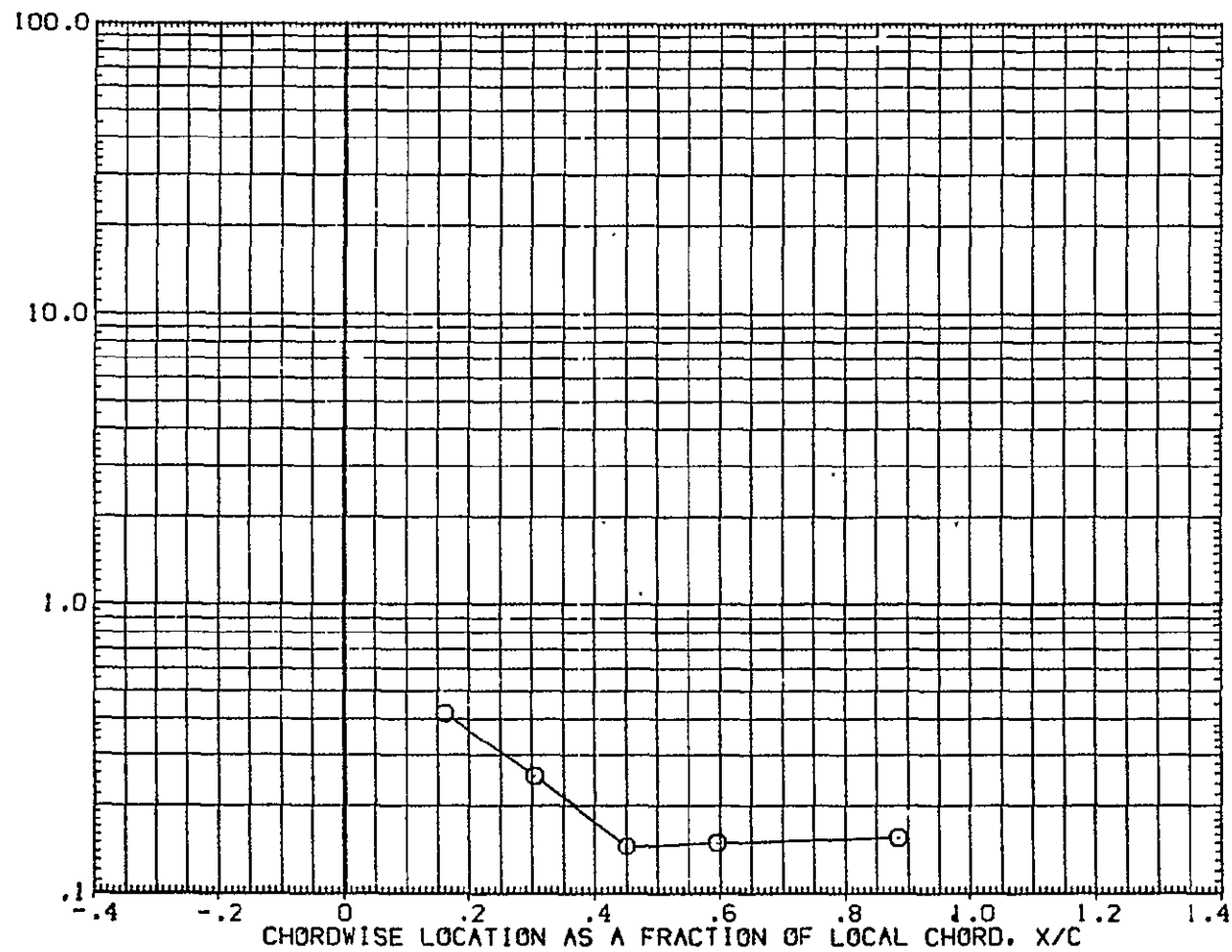


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 0T(05)/0(07) WING L.S. (IUG#05)

SYMBOL	HAW/HT	2Y/B	MACH	ALPHA	PARAMETRIC VALUES		
○	.900	.400	18.300		.000	SETA	.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

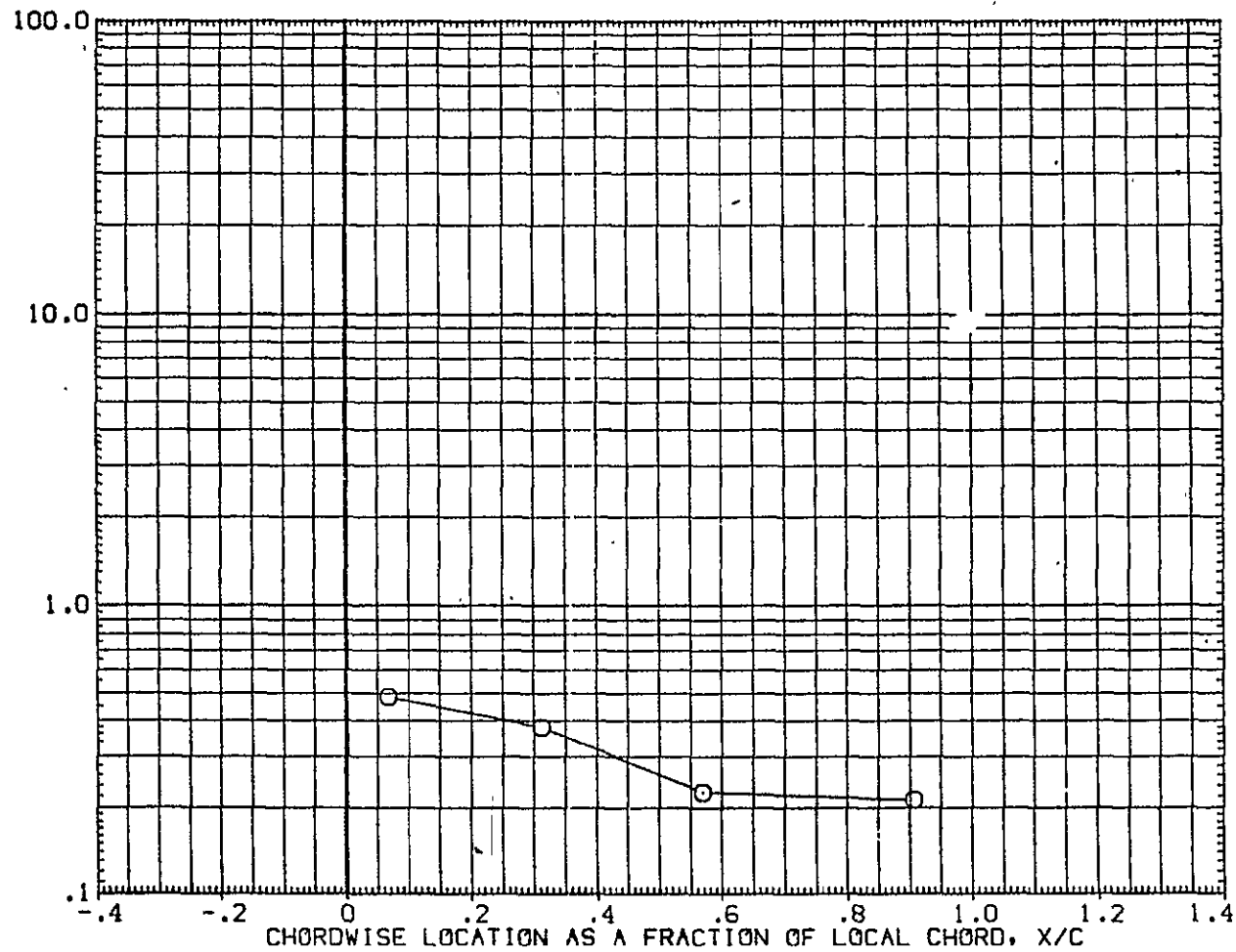


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12 + IH21 MODEL 37 0T(05)/0(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES
O	.900	.500	18.300	ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

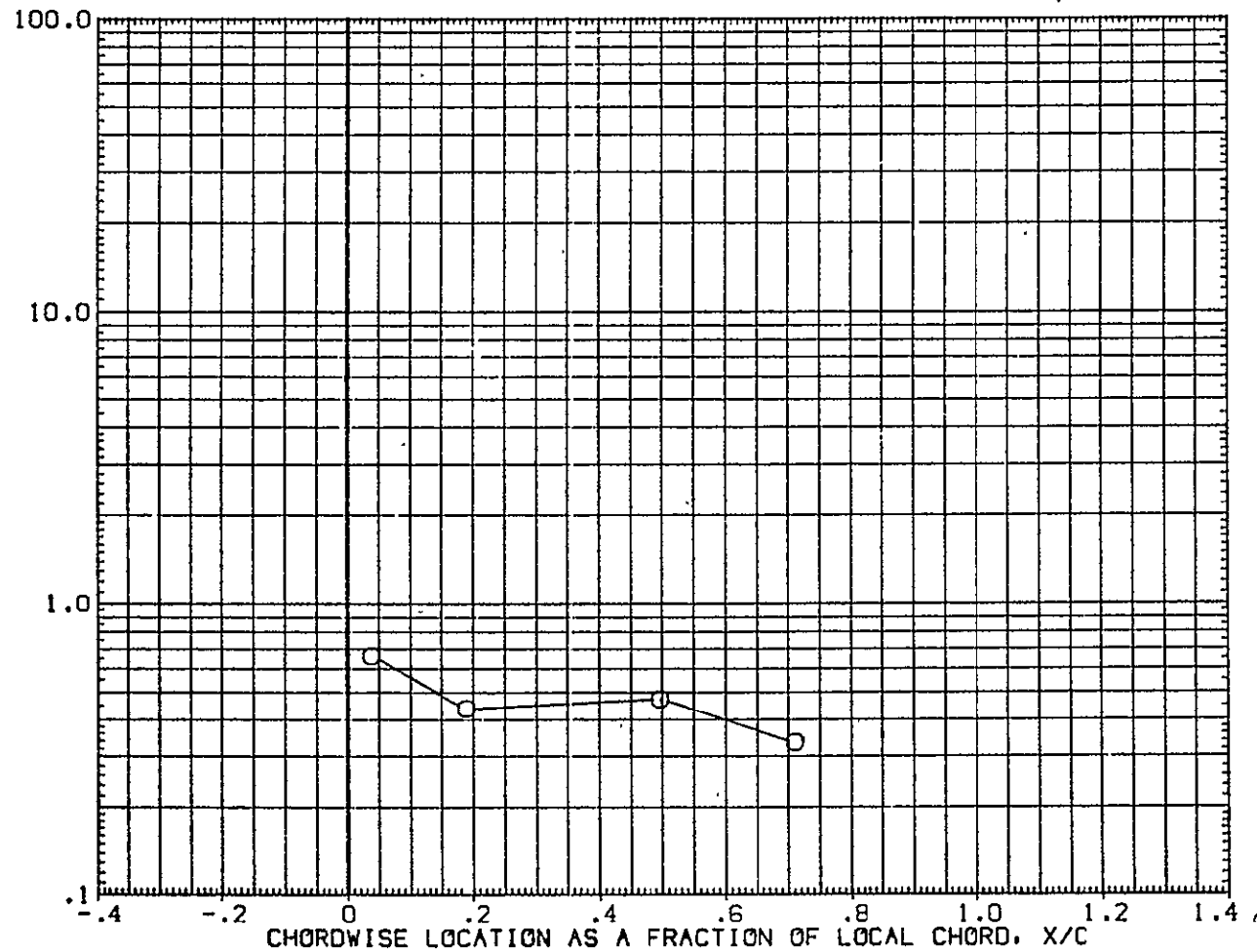


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12 + 1H21 MODEL 37 OT(05)/0(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
O	.900	.600	18.300	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

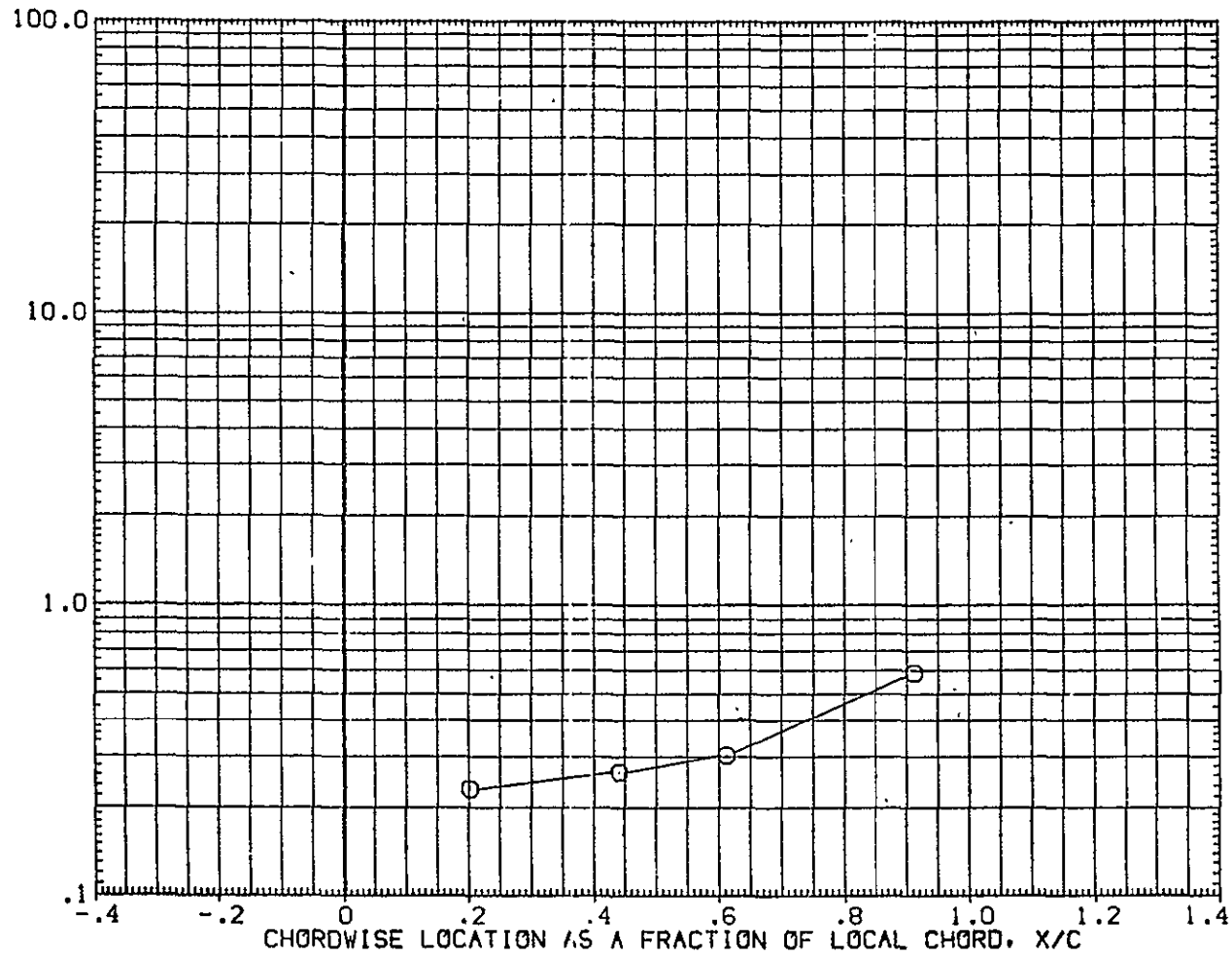


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12 + IH21 MODEL 37 OT(05)/0(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES
O	.900	.750	18.300	ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

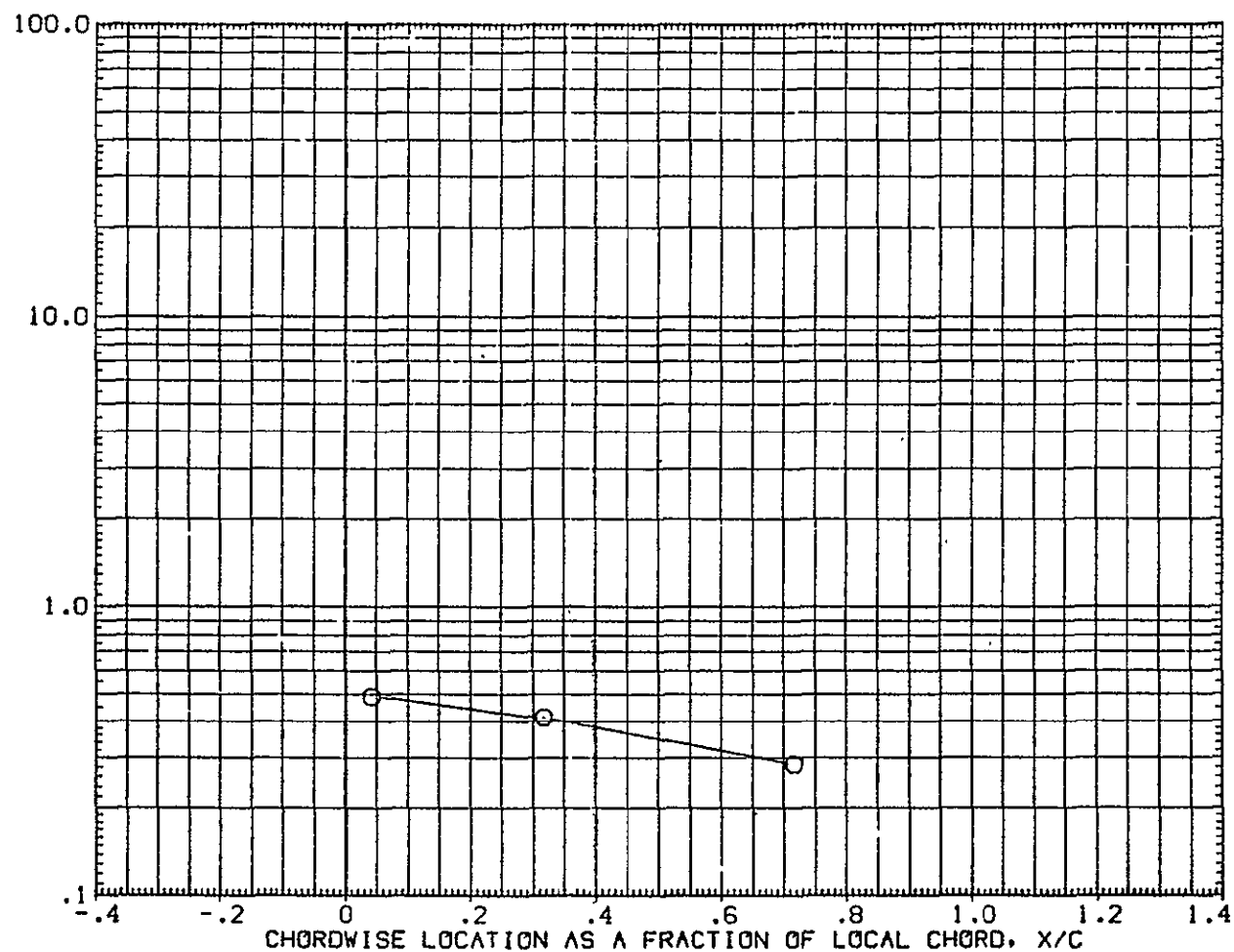


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0~

0H12 + 1H21 MODEL 37 0T(05)/0(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	ALPHA	PARAMETRIC VALUES	BETA	
○	.900	.950	18.300		.000		.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

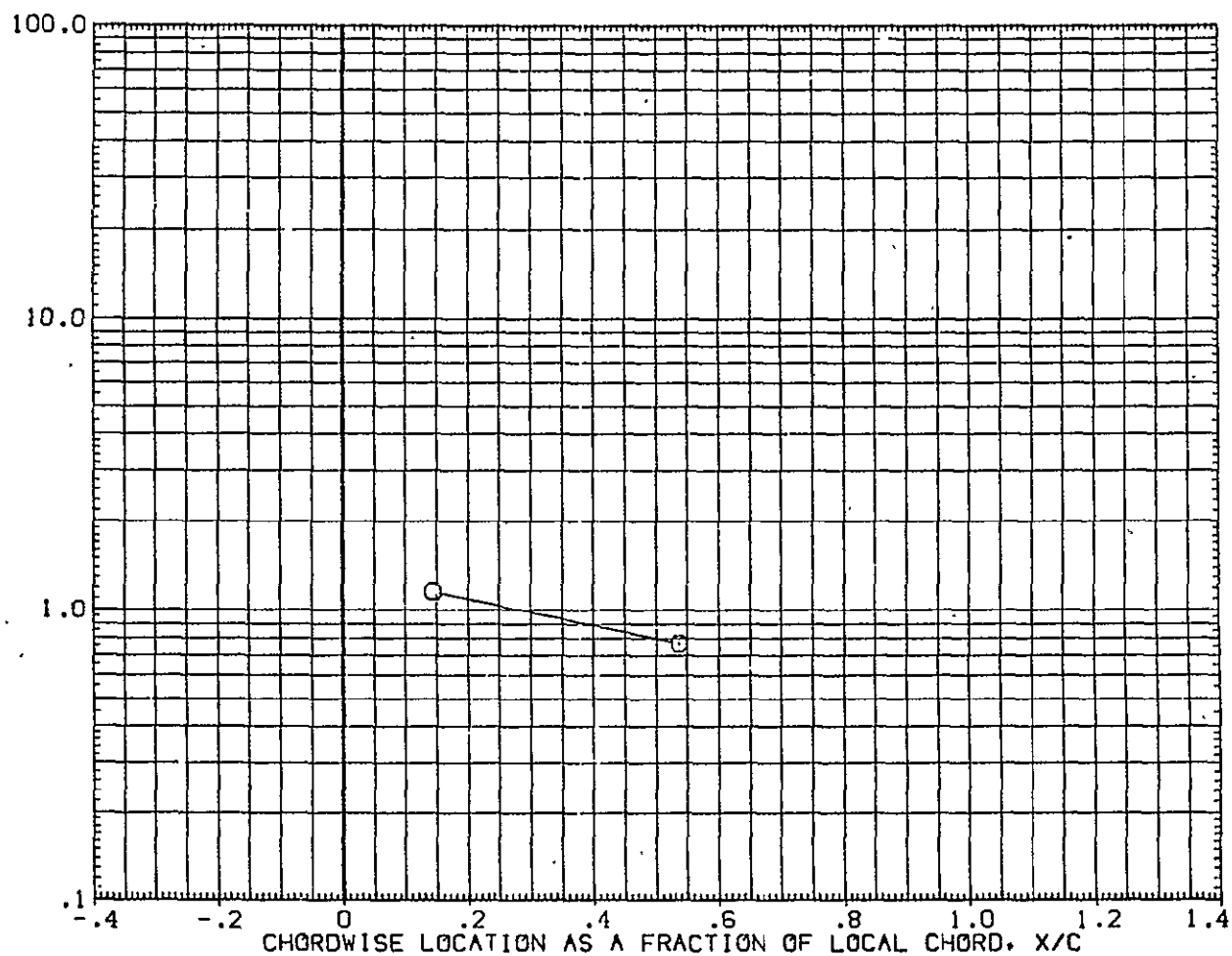


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12 + IH21 MODEL 37 OT(05)/O(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	2r/B	MACH	PARAMETRIC VALUES		
○	.900	.250	19.180	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

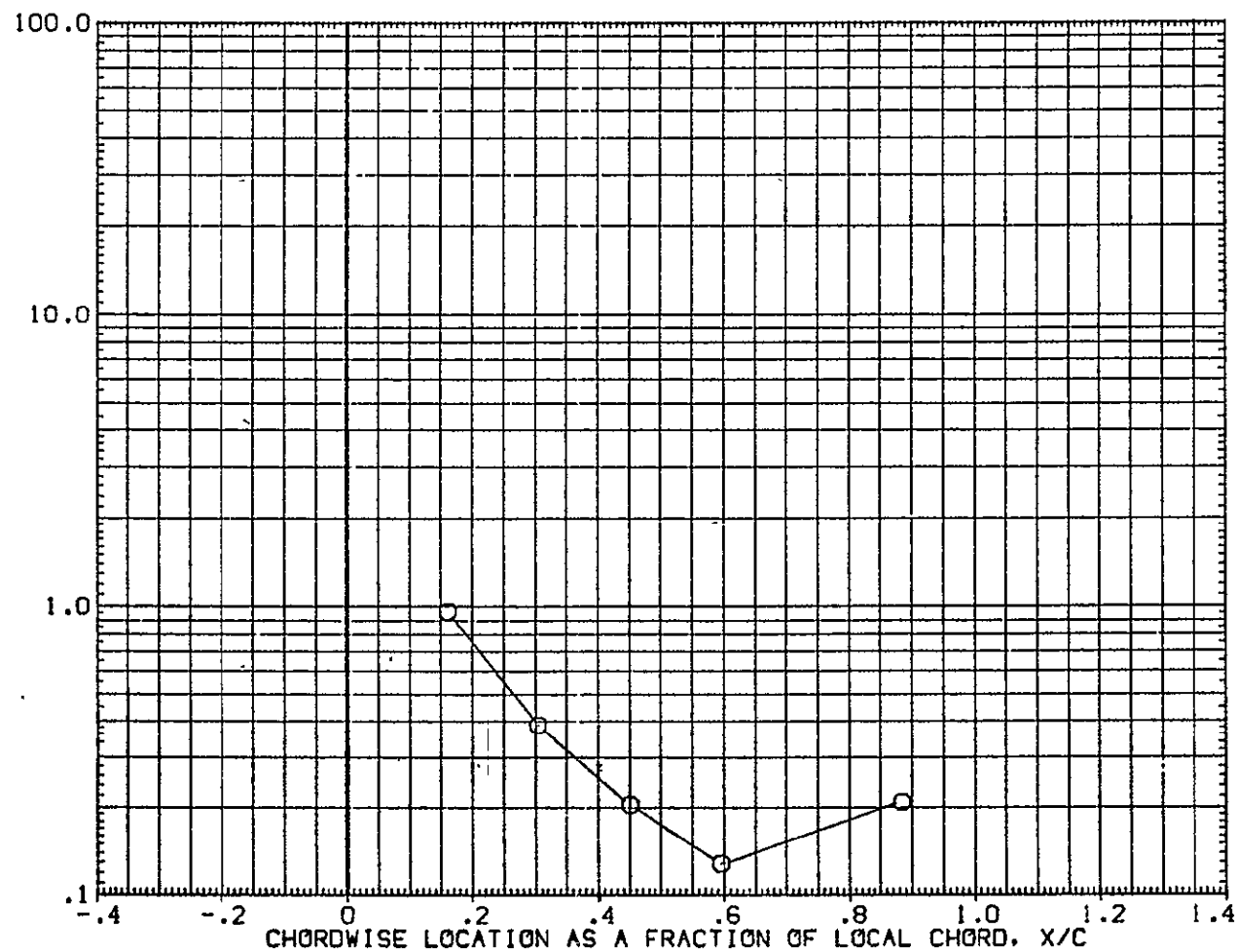


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

OH12 + IH21 .MODEL 37 OT(05)/O(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
O	.900	.400	19.180	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

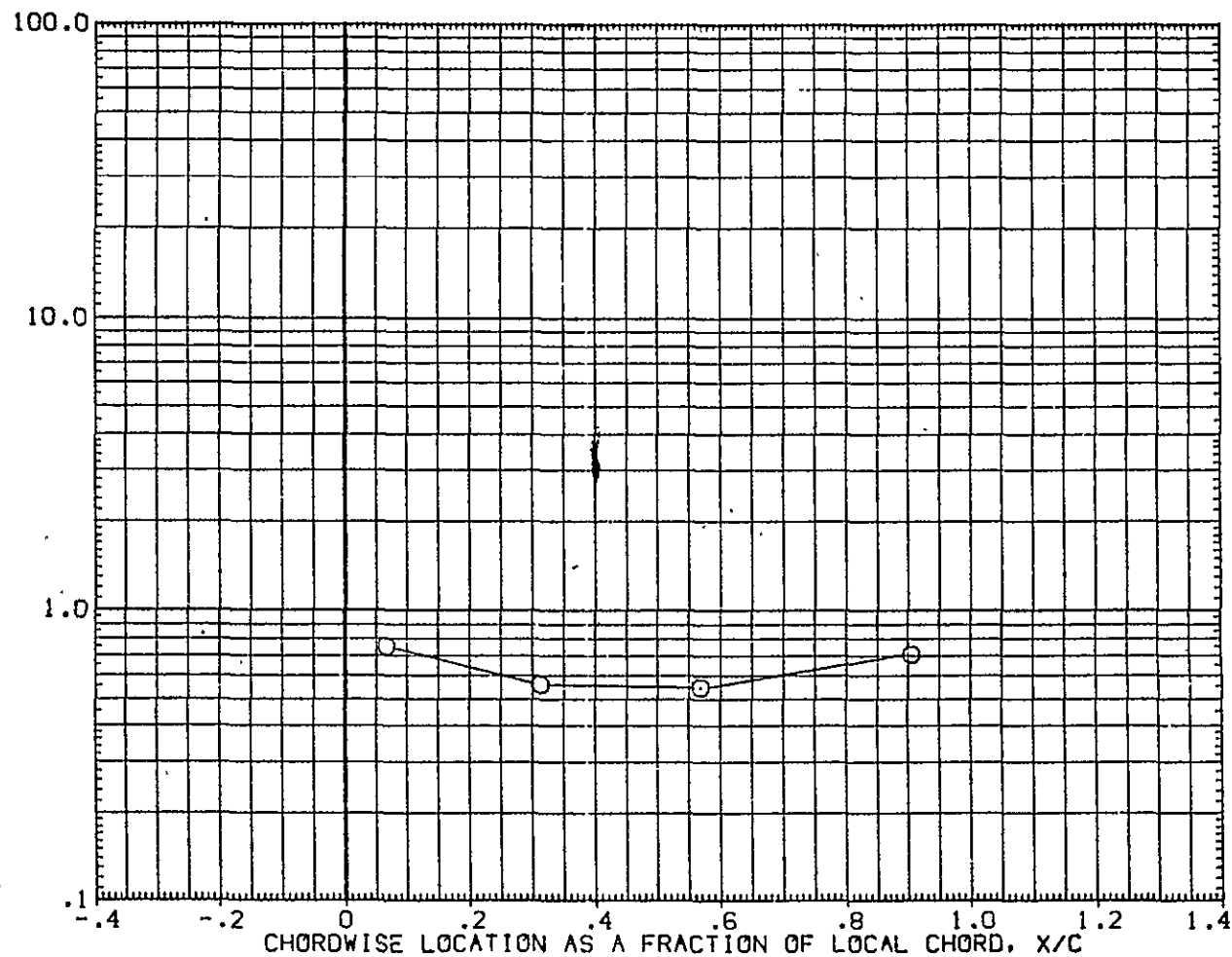


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

0H12 + 1H21 MODEL 37 0T(05)/0(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
○	.900	.500	19.180	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

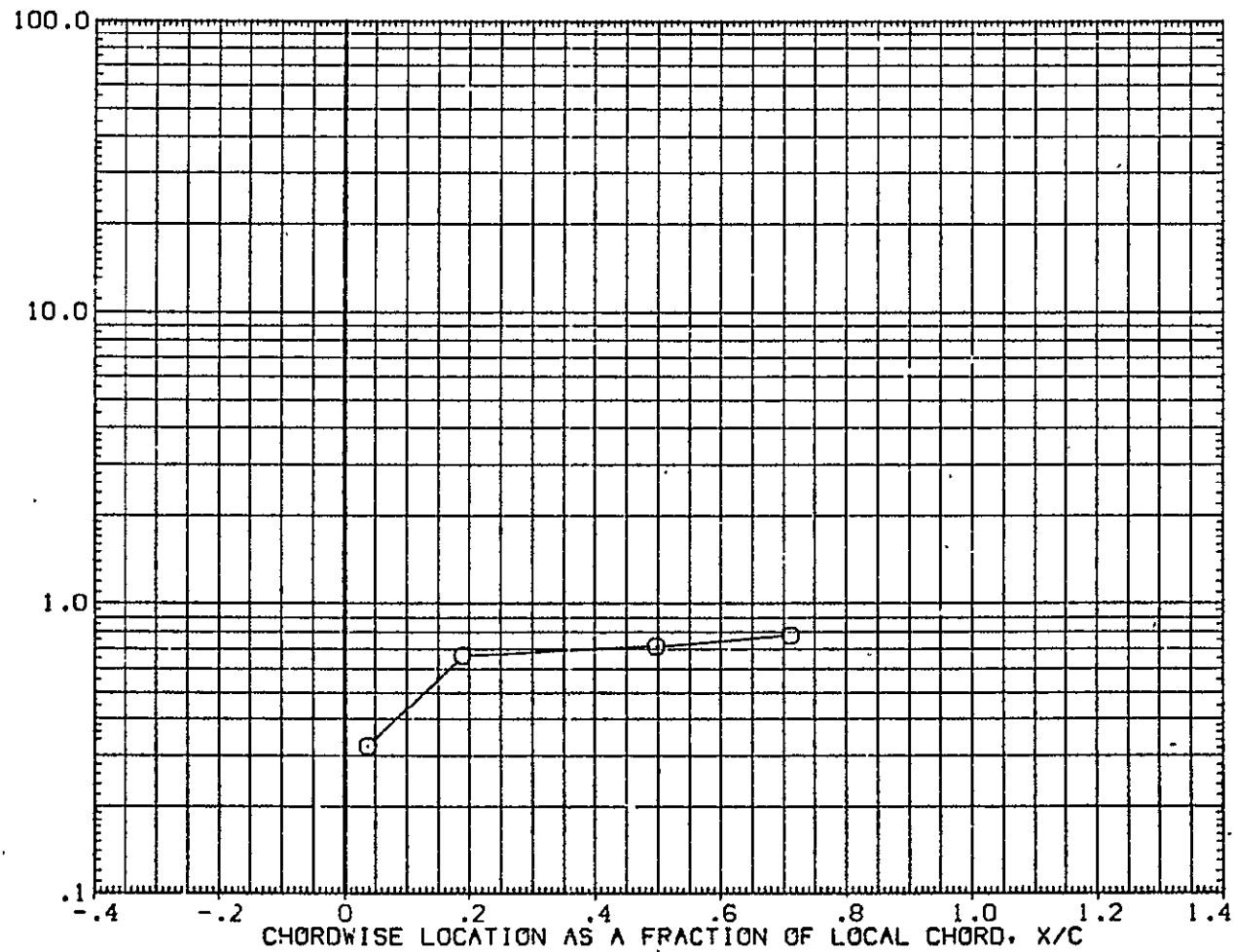


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER. ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/O(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
O	.900	.600	19.180	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

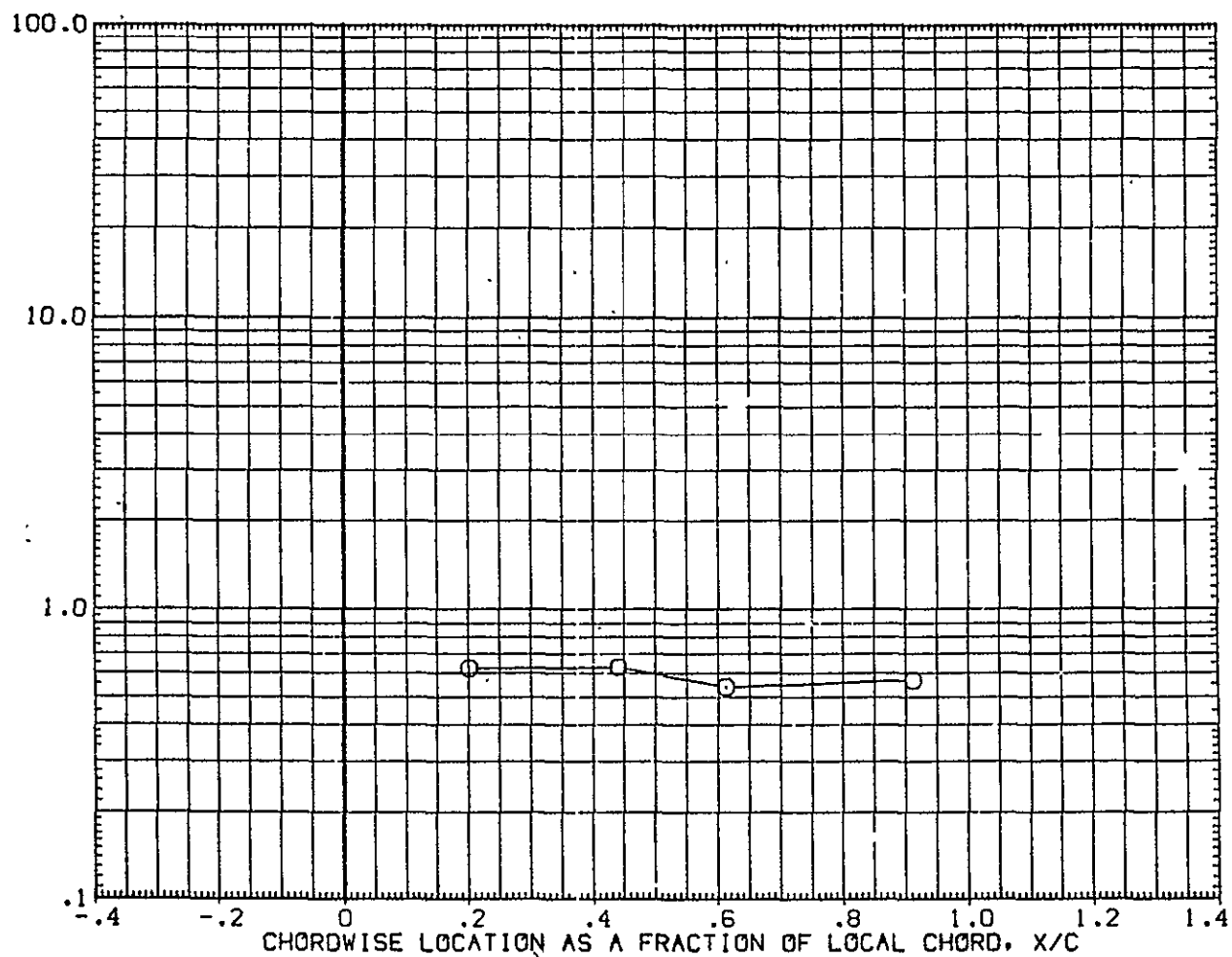


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 01(05)/0(07) WING L.S. (IUGW05)

SYMBOL	HAW/HT	ZY/B	MACH	ALPHA	PARAMETRIC VALUES	BETA	
○	.900	.750	19.180	.000	.000	.000	

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

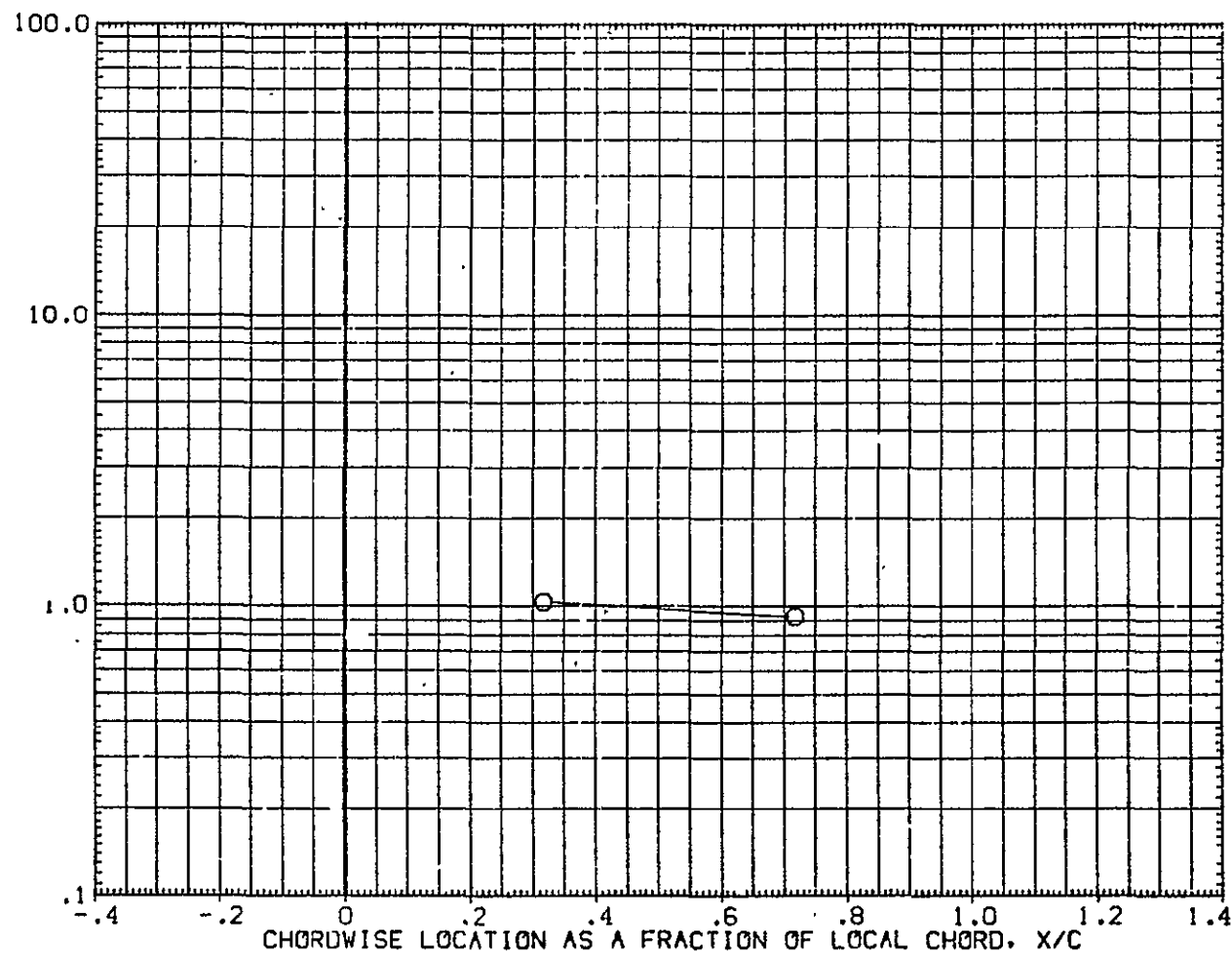


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0^\circ$

OH12 + IH21 MODEL 37 OT(05)/O(07) WING L.S. (IUGW05)

SYMBOL
O
HAW/HT
.900
ZY/B
.950
MACH
19.180

PARAMETRIC VALUES
ALPHA
.000
BETA
.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

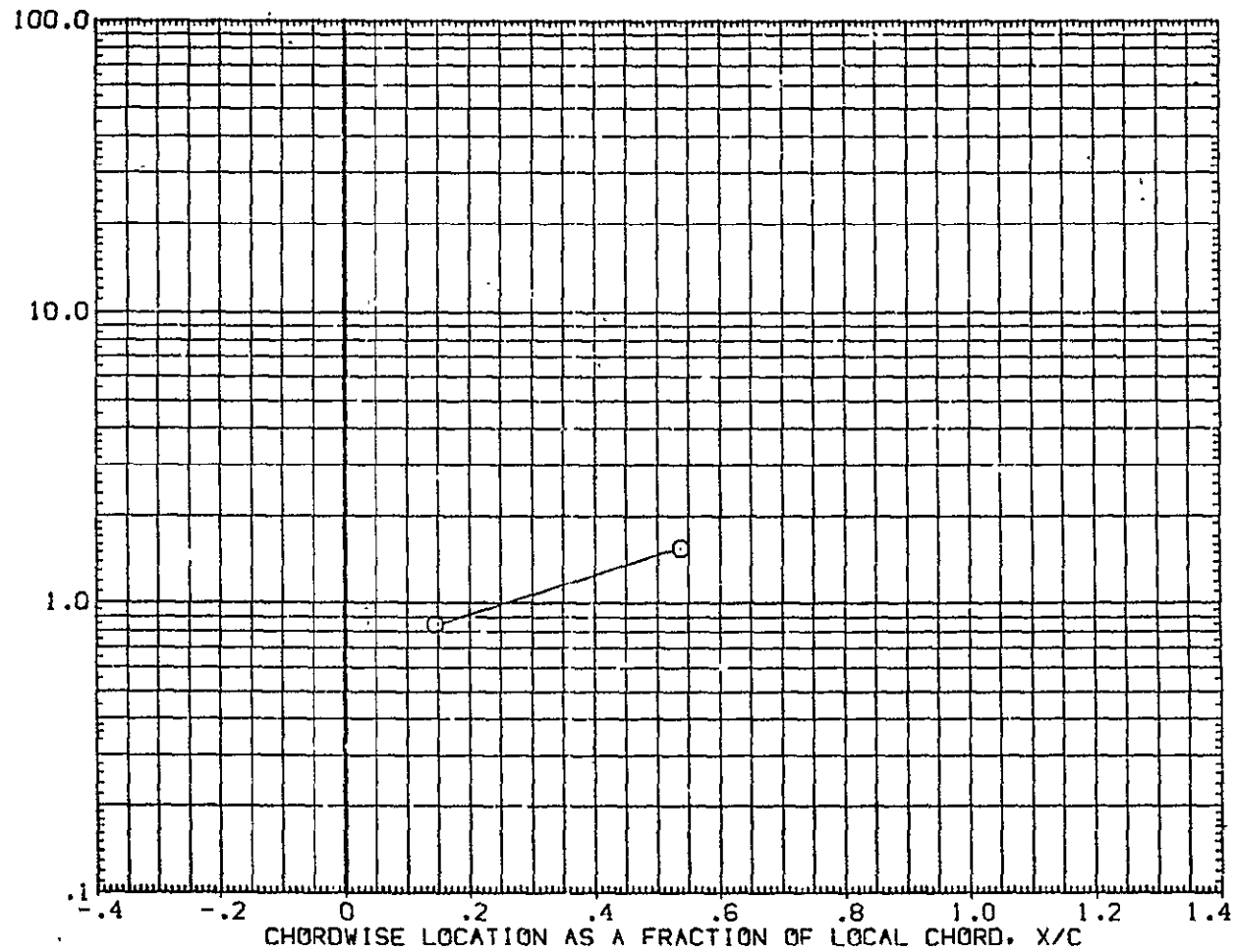


FIG. 9 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0

VERTICAL (RUGV07)

SYMBOL	HAW/WT	GAGENO	MACH	PARAMETRIC VALUES	
				ALPHA	BETA
○	.850	40.000	5.997	.000	.000
□	.300				
◇	1.000				

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

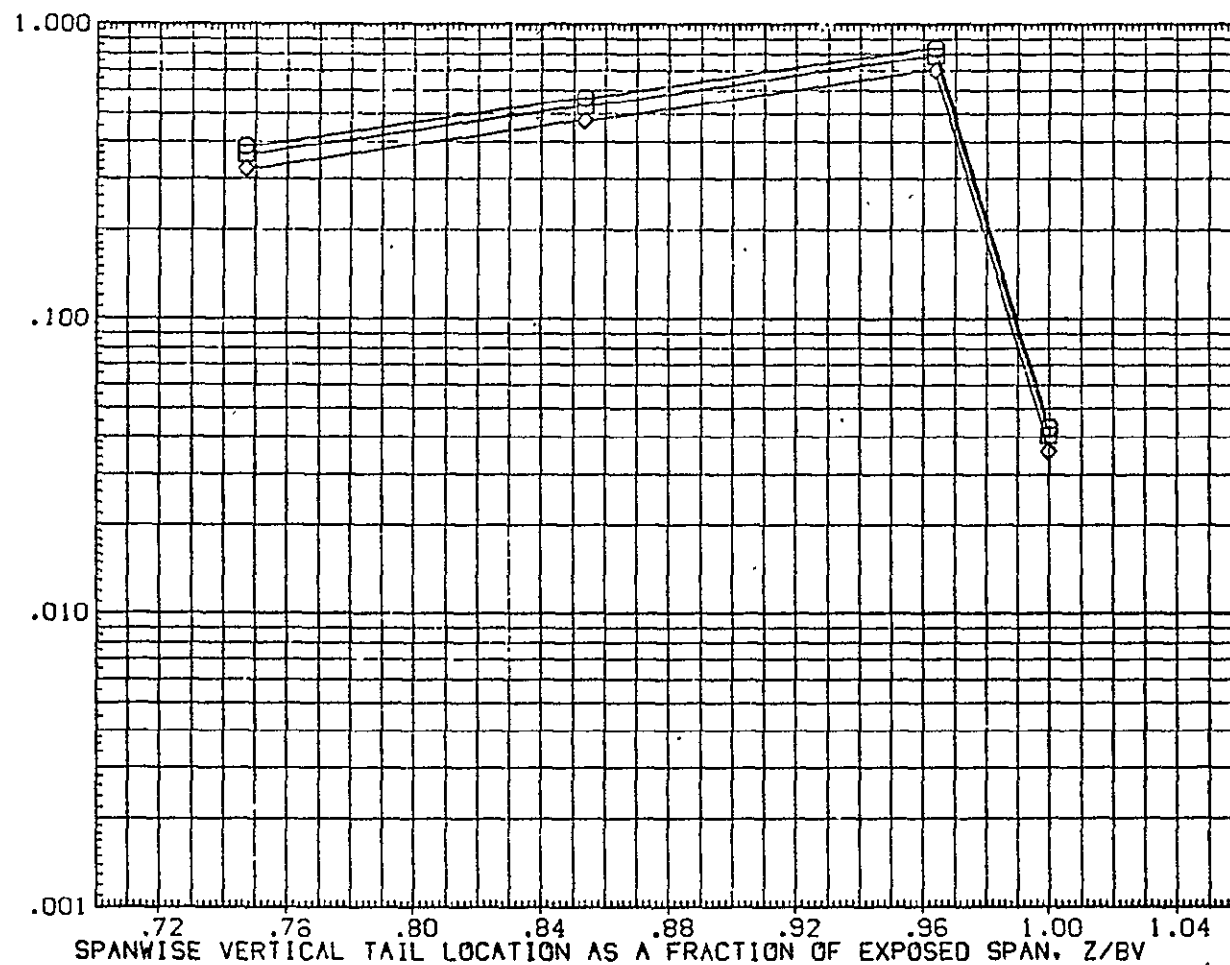


FIG. 10 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0

VERTICAL (RUGV07)

SYMBOL
□
□
◇

HAU/HT
.850
.900
1.000

GAGENO
40.000

MACH
7.614

PARAMETRIC VALUES
ALPHA .000 BETA .000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

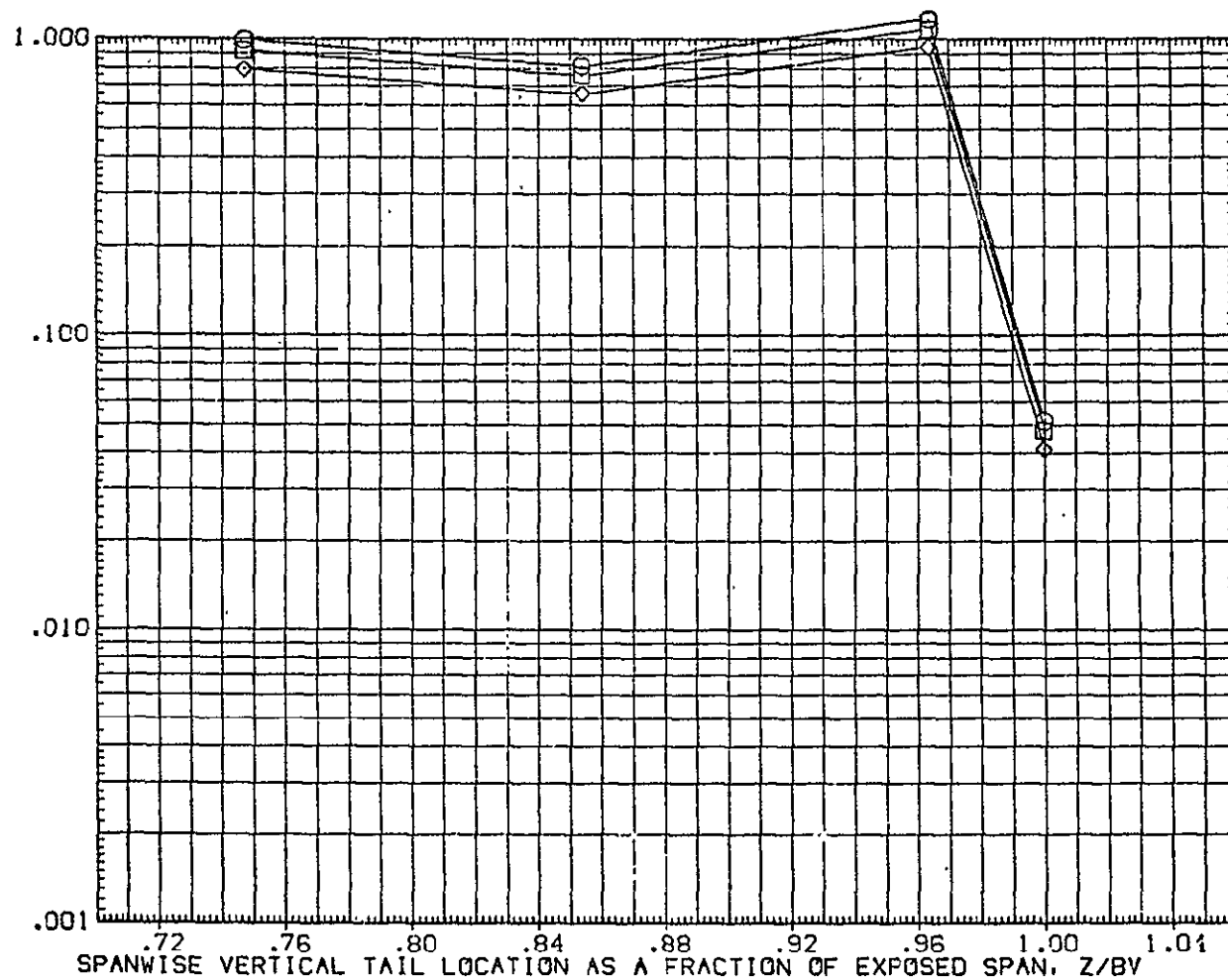


FIG. 10 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0

VERTICAL (RUGV07)

SYMBOL	HAW/HT	GAGE NO	MACH	PARAMETRIC VALUES
○	.850	40.000	16.000	ALPHA .000 BETA .000
□	.900			
◇	1.000			

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

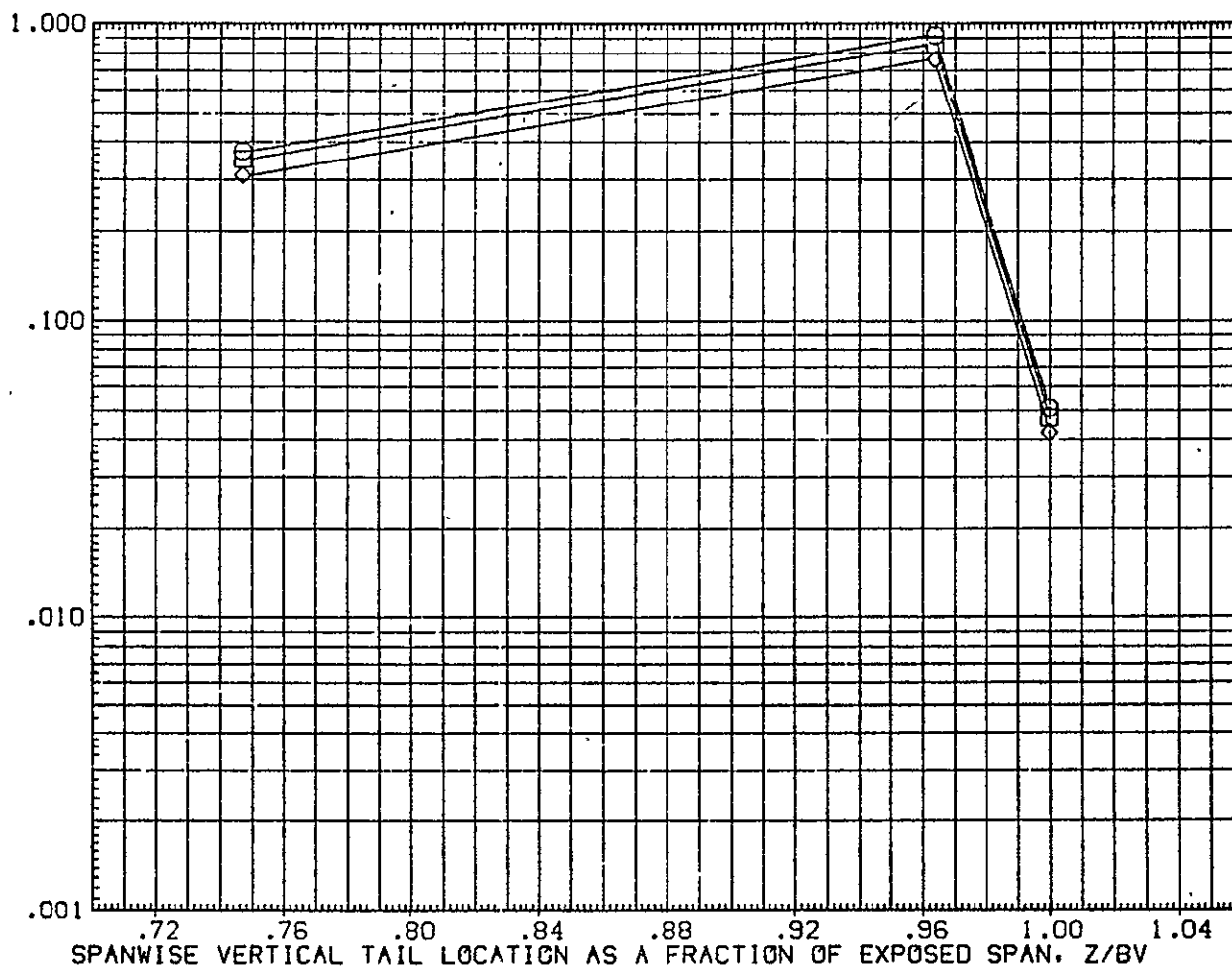
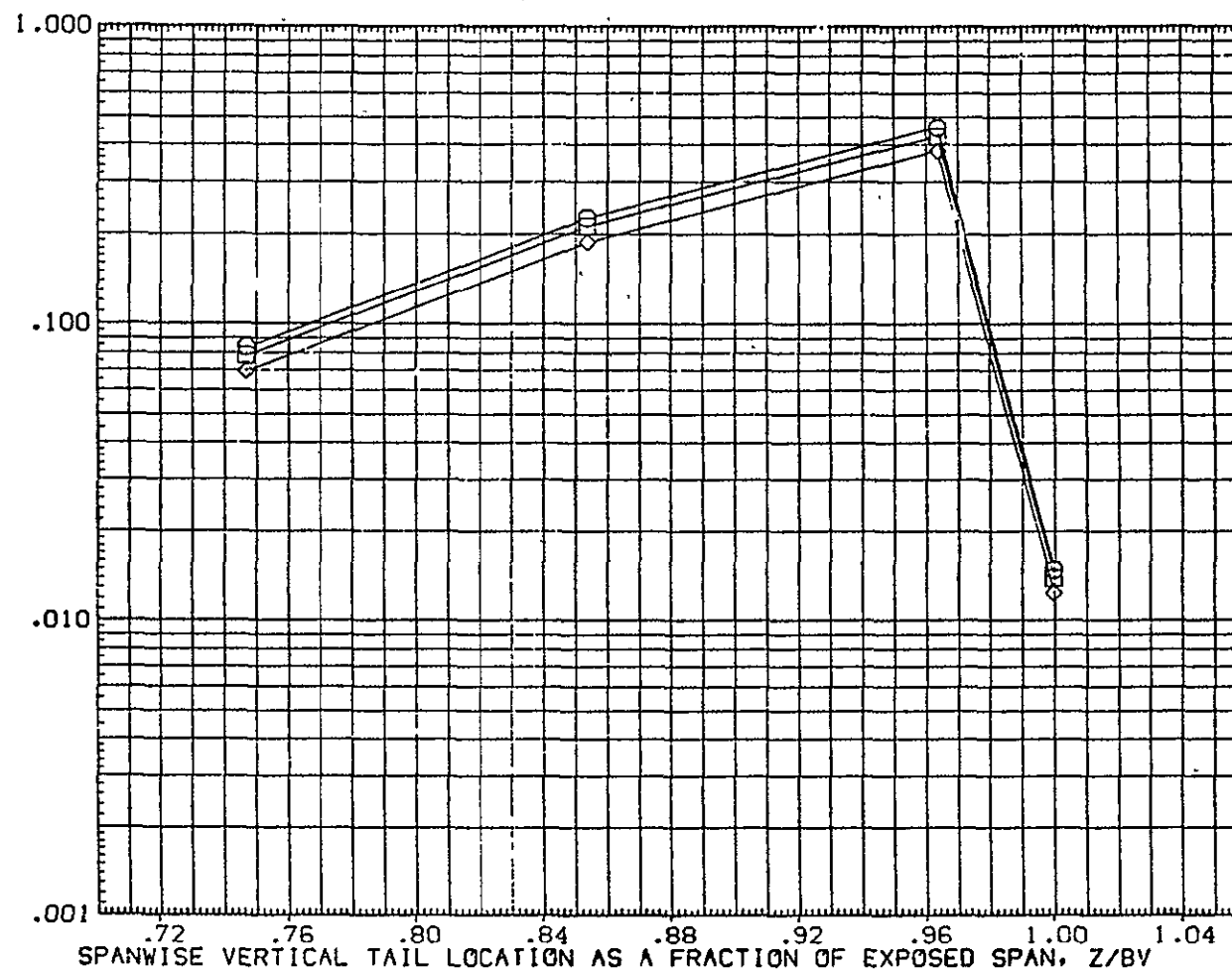


FIG. 10 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0

VERTICAL (RUGV07)

SYMBOL	HAW/HT	GAGE#	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.950	40.000	18.31°	.000	.000	.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF} FIG. 10 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0

VERTICAL (RUGV07)

SYMBOL
 \square
 \diamond

HAW/HT
 850
 .900
 1.000

GAGENO
 40.000

MACH
 19.190

PARAMETRIC VALUES
 ALPHA .000 BETA .000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

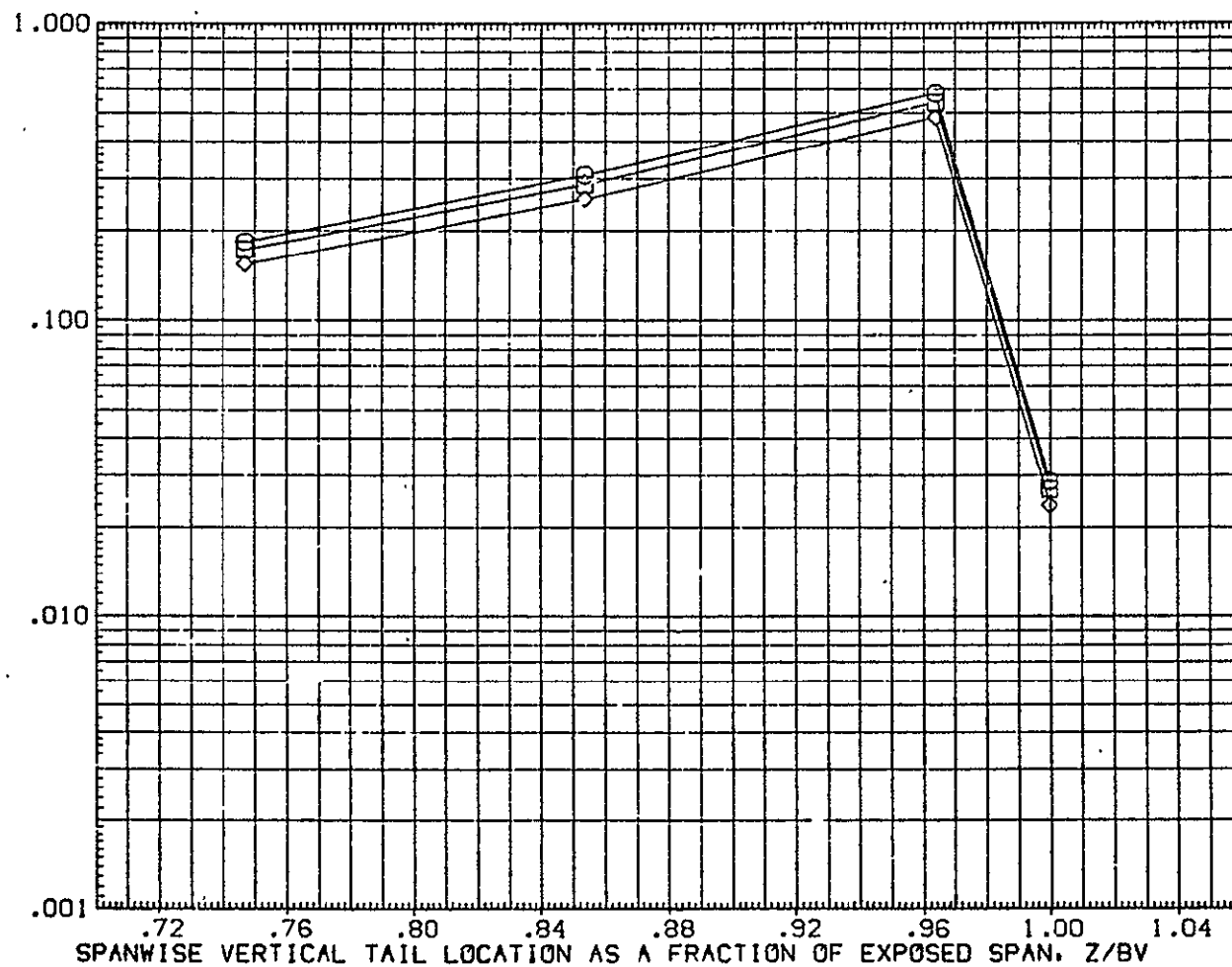


FIG. 10 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T VERTICAL (RUGV05)

SYMBOL	HAW/HT	GAGENO	MACH	PARAMETRIC VALUES		
◇	.850	40.000	6.999	ALPHA	.000	BETA
◇	.900					.000
◇	1.000					

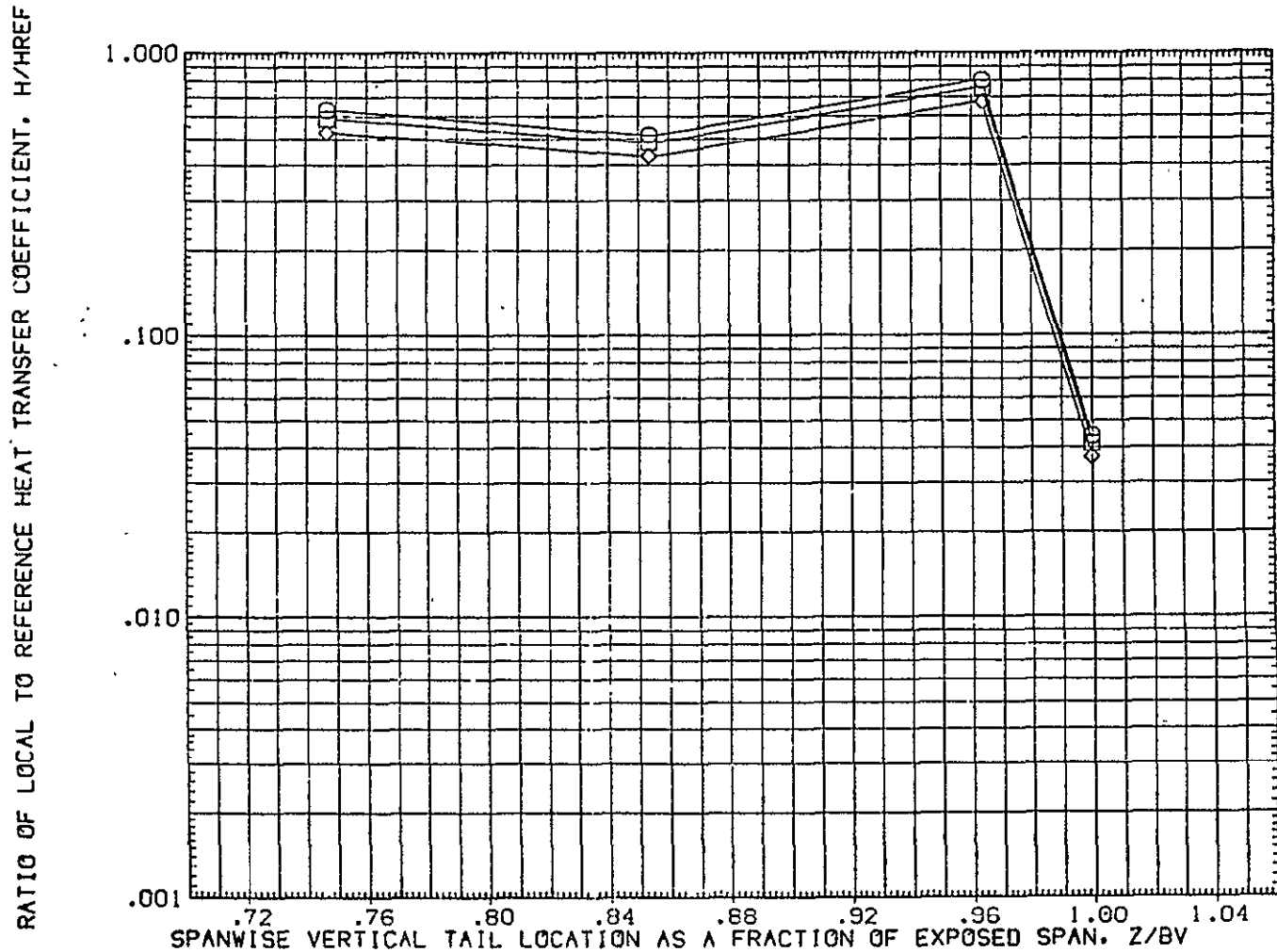


FIG. 10 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T VERTICAL (RUGV05)

SYMBOL	HAW/HT	GAGENO	MACH	ALPHA	PARAMETRIC VALUES	
□	.850	40.000	7.616	.000	BETA	.000
◇	1.000					

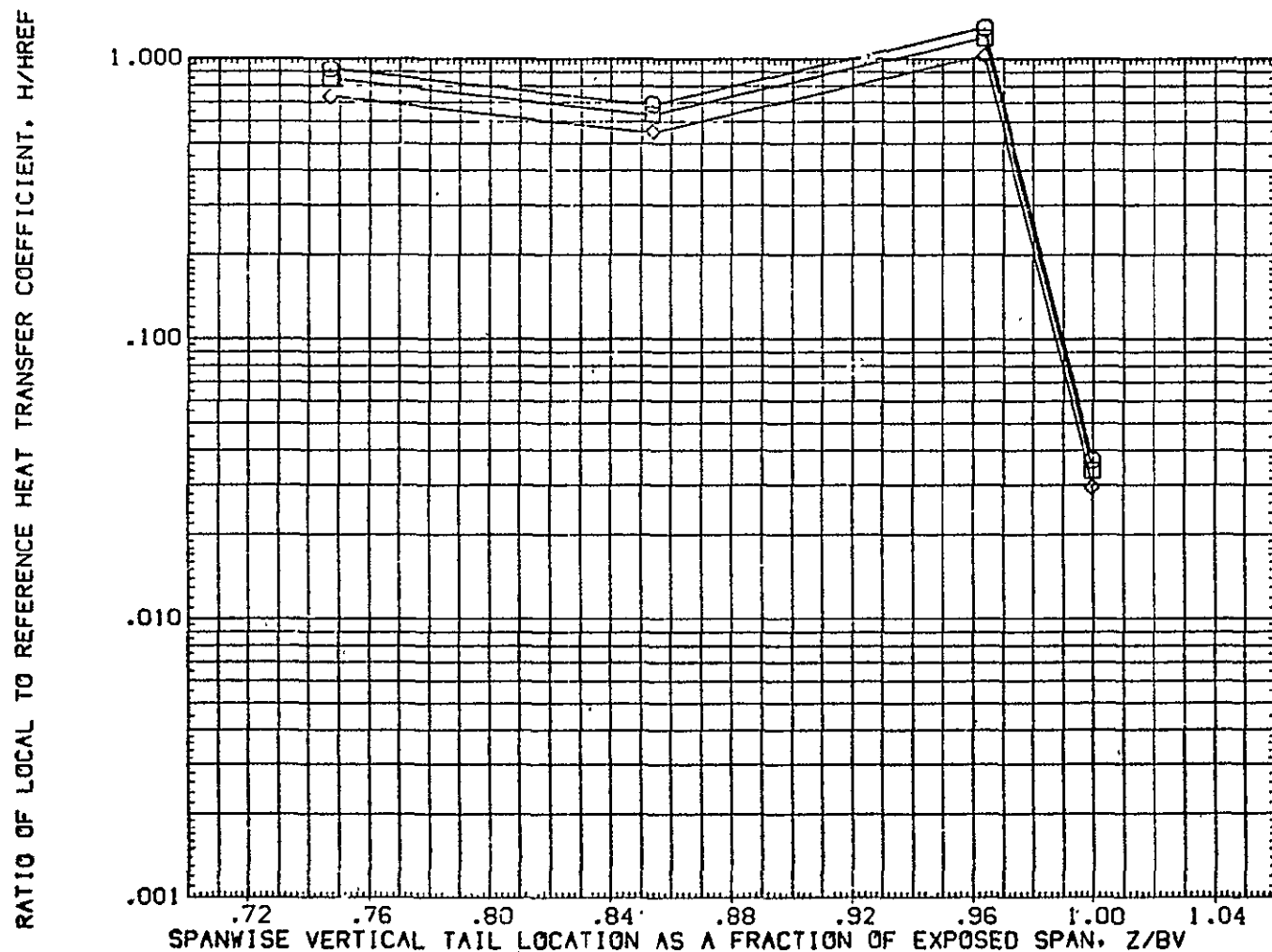


FIG. 10 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER ALPHA = 0

0H12/IH21 (CAL HST 173-100) 37 0 T VERTICAL (RUGV05)

SYMBOL	HAW/HT	GAGENO	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	40.000	18.330	.000		.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

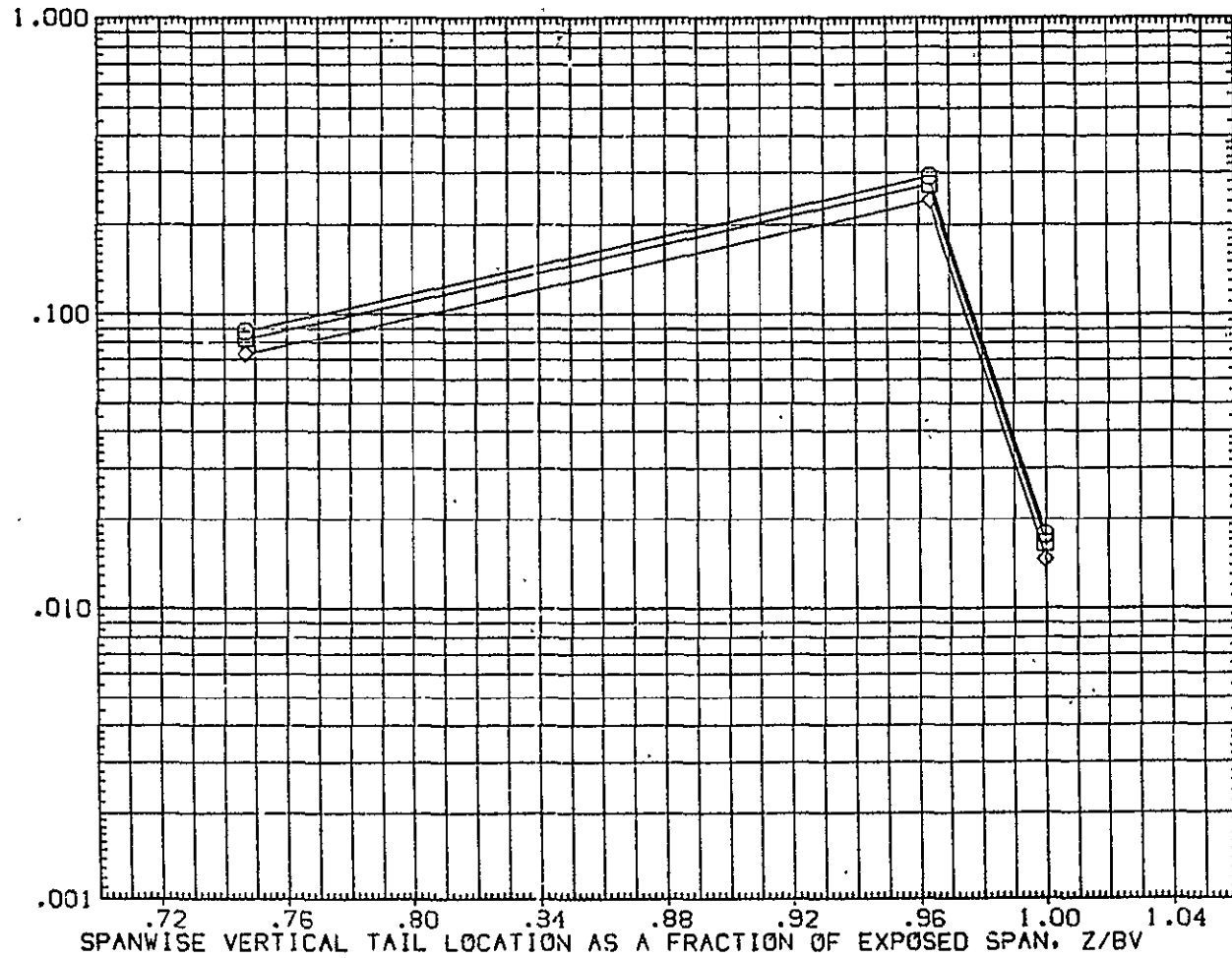


FIG. 10 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER ALPHA = 0

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR.

OH12/IH21 (CAL HST 173-100) 37 0 T VERTICAL (RUGV05)

SYMBOL	HAW/HT	GAGE NO	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	40.000	19.200	.000	.000	.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

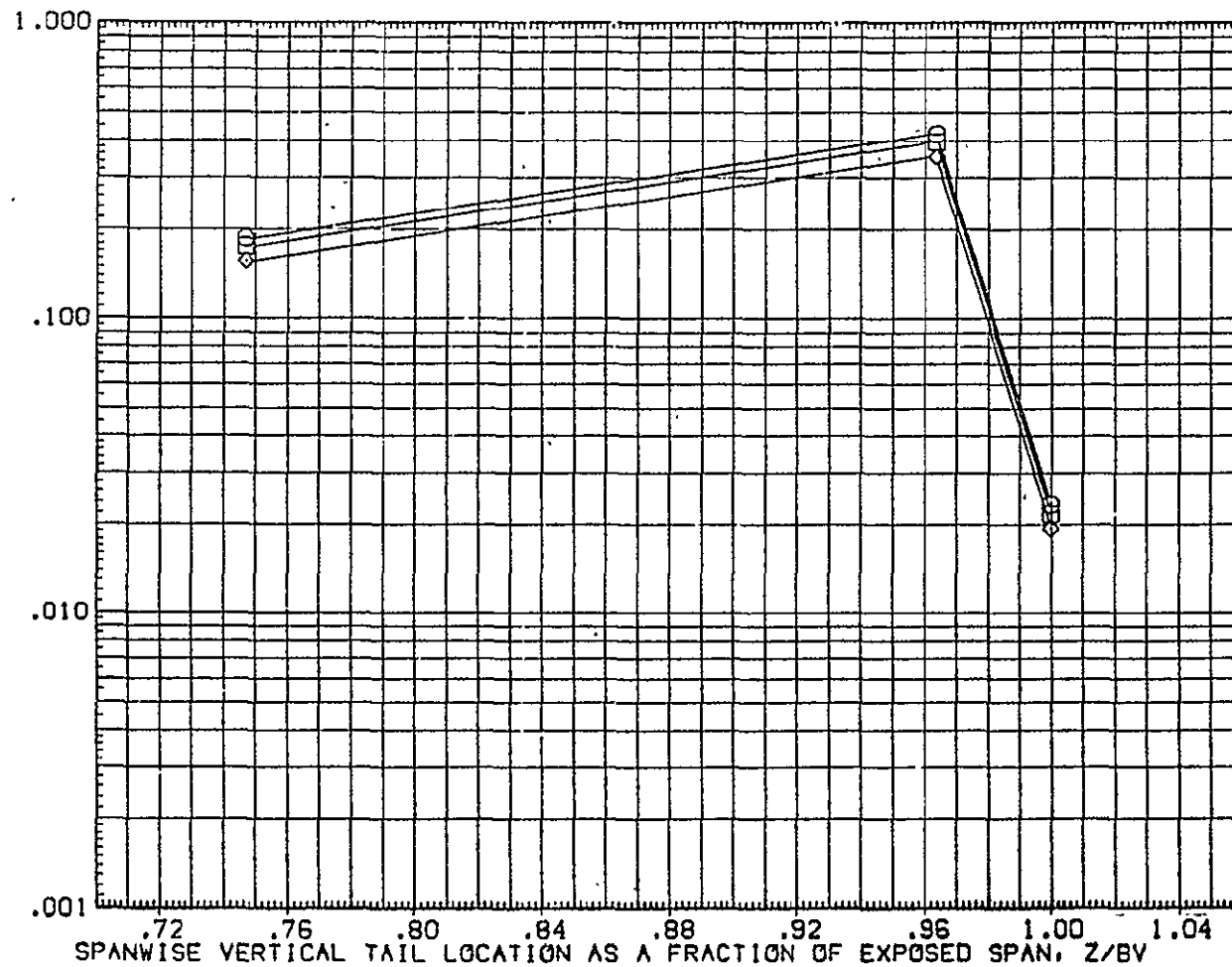


FIG. 10 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER $\alpha = 0$

0H12 + IH21 MODEL 37 0T(05)/0(07) VERTICAL (IUGV05)

SYMBOL
O
MAW/HT
.900
GAGE/HO
40.000
MACH
7.000

PARAMETRIC VALUES
ALPHA
.000
BETA
.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

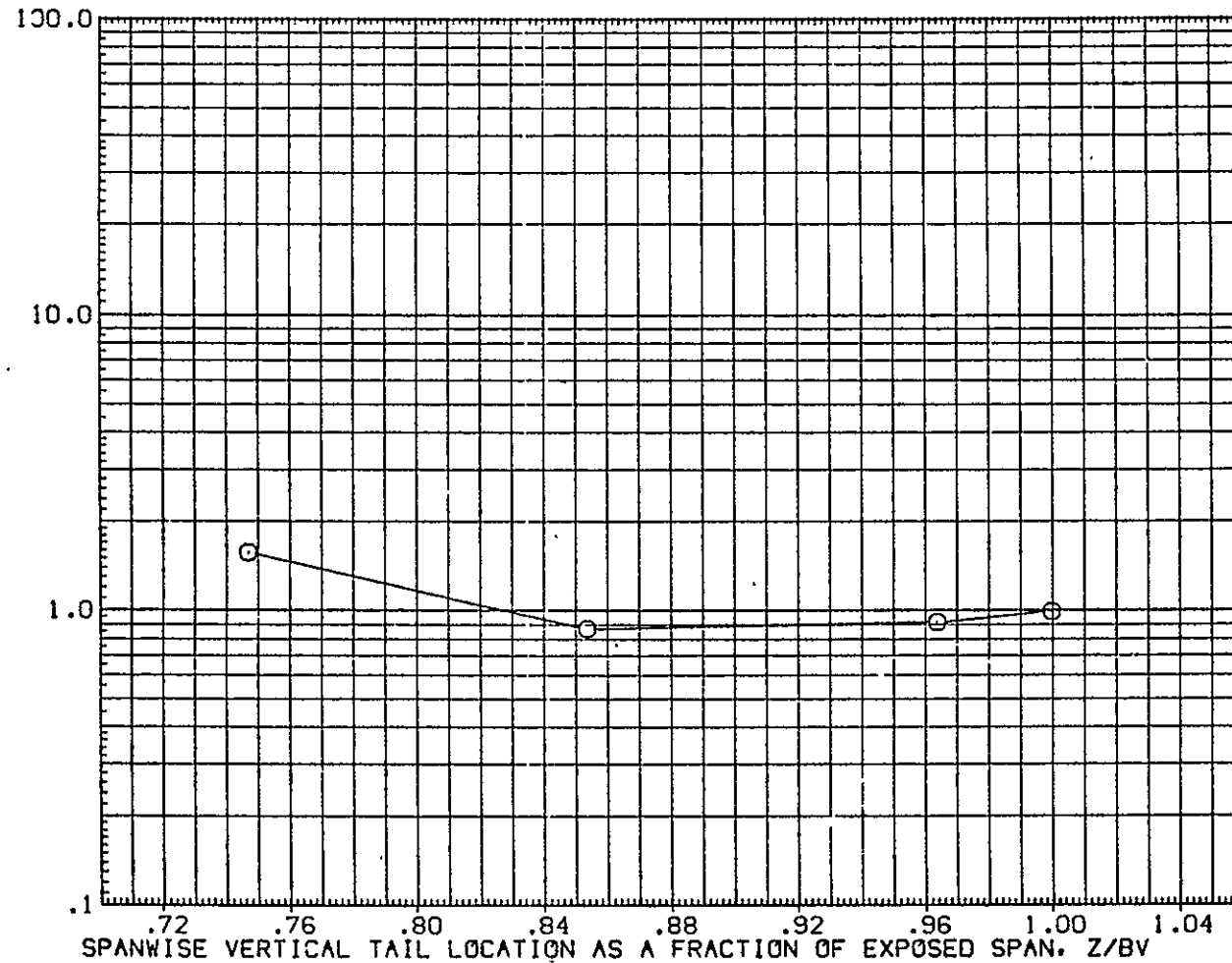


FIG. 10 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER ALPHA = 0

0H12 + 1H21 MODEL 37 0T(05)/0(07) VERTICAL (IUGV05)

SYMBOL	HAW/HT	GAGENO	MACH	PARAMETRIC VALUES		
○	.900	40.000	7.610	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

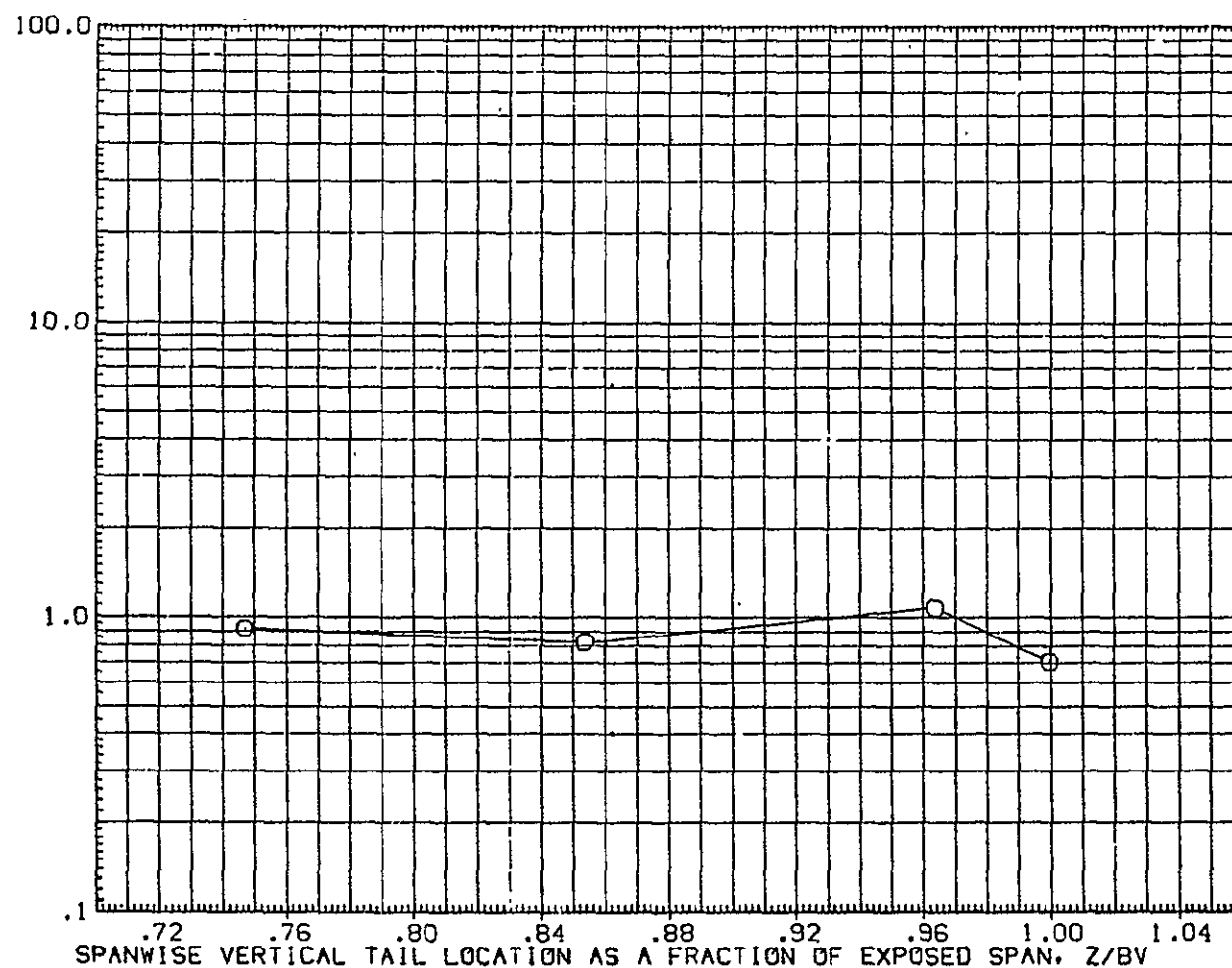


FIG. 10 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER ALPHA = 0

0H12 + 1H21 MODEL 37 0T(05)/0(07) VERTICAL (1UGV05)

SYMBOL	HAW/HT	GAGEND	MACH	PARAMETRIC VALUES		
○	.900	40.000	18.300	ALPHA	.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

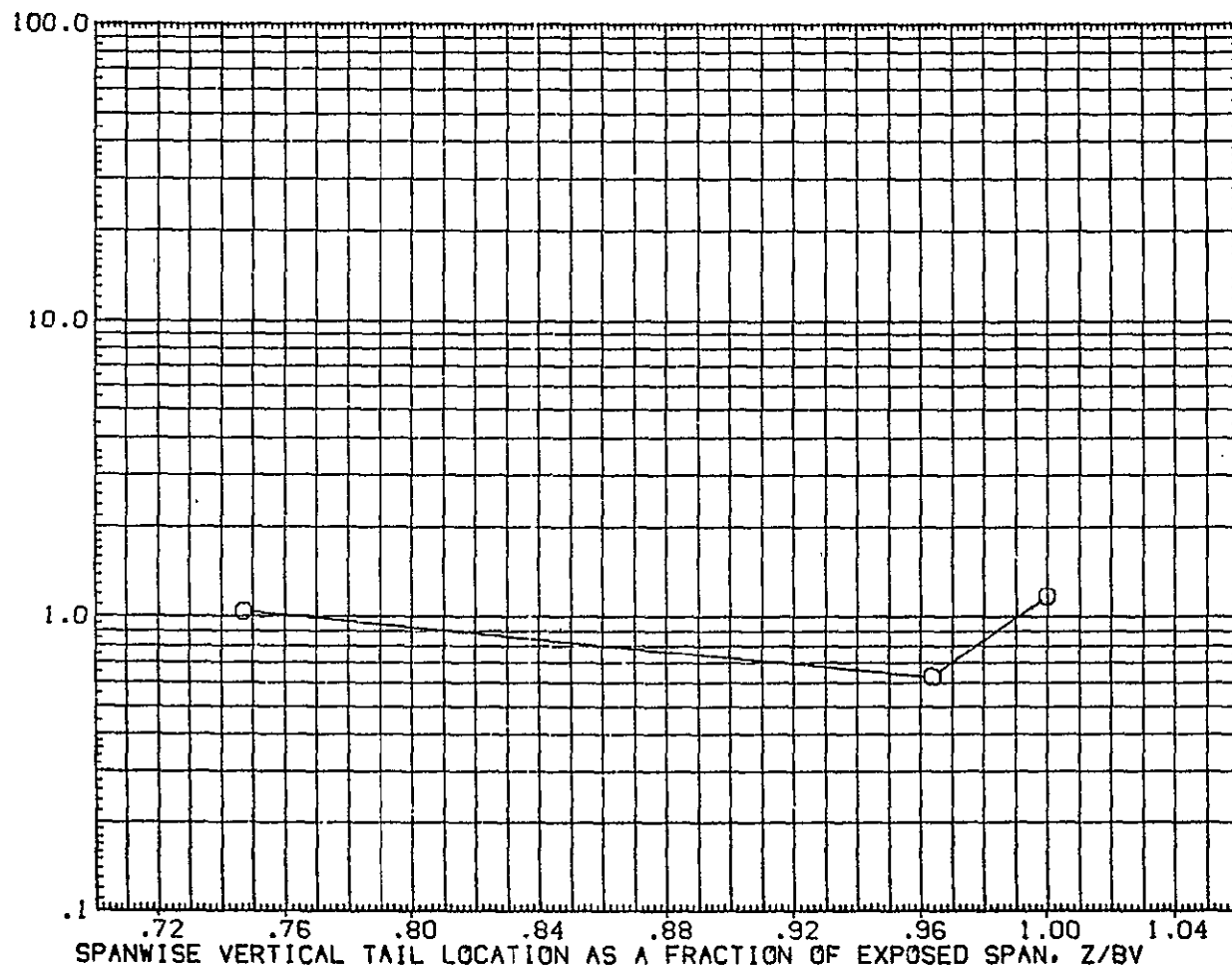


FIG. 10 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER ALPHA = 0

OH12 + IH21 MODEL 37 OT(05)/O(07) VERTICAL (IUGV05)

SYMBOL
O
HAW/HT .900
GAGE NO 40.000
MACH 19.180

PARAMETRIC VALUES
ALPHA .000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

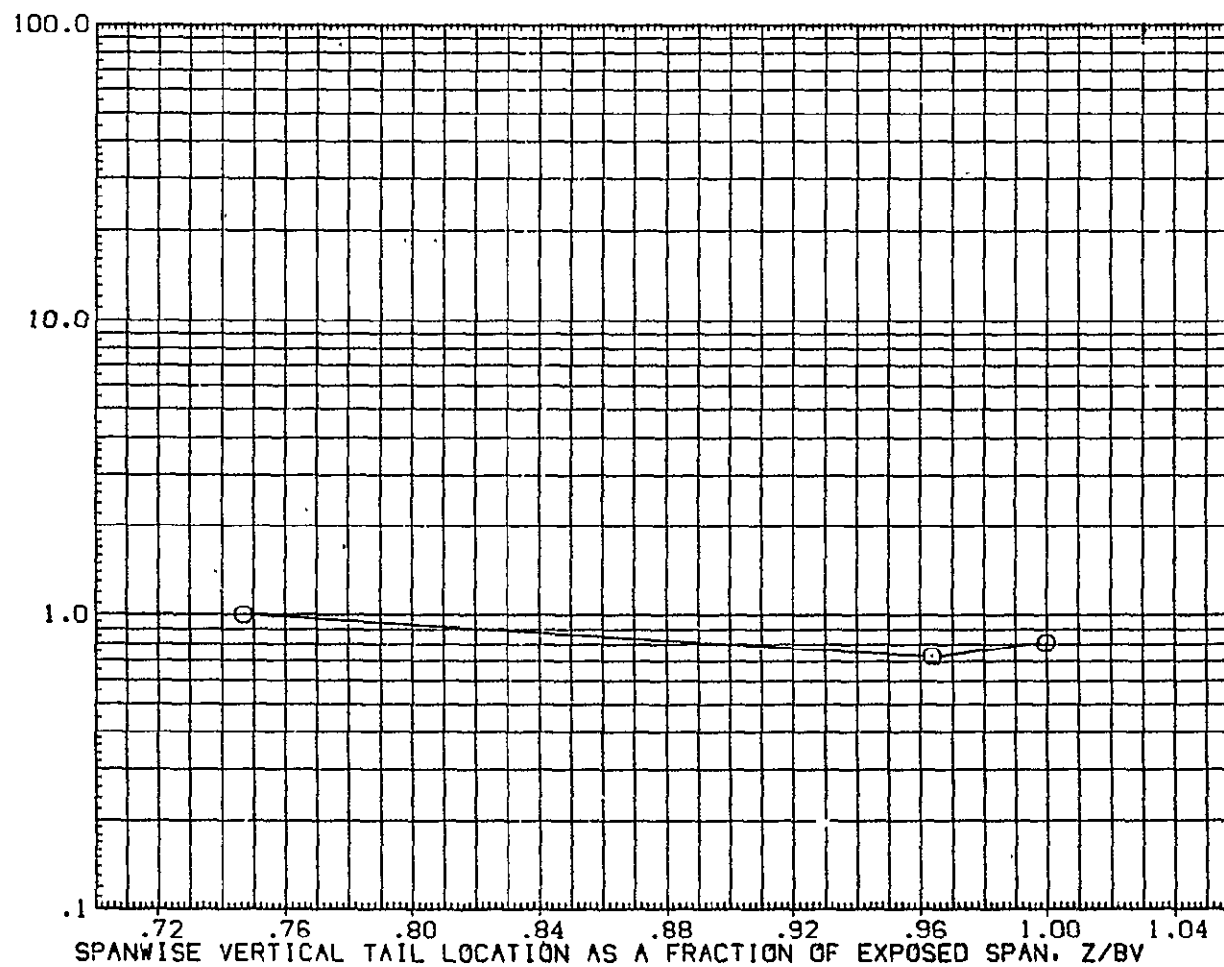
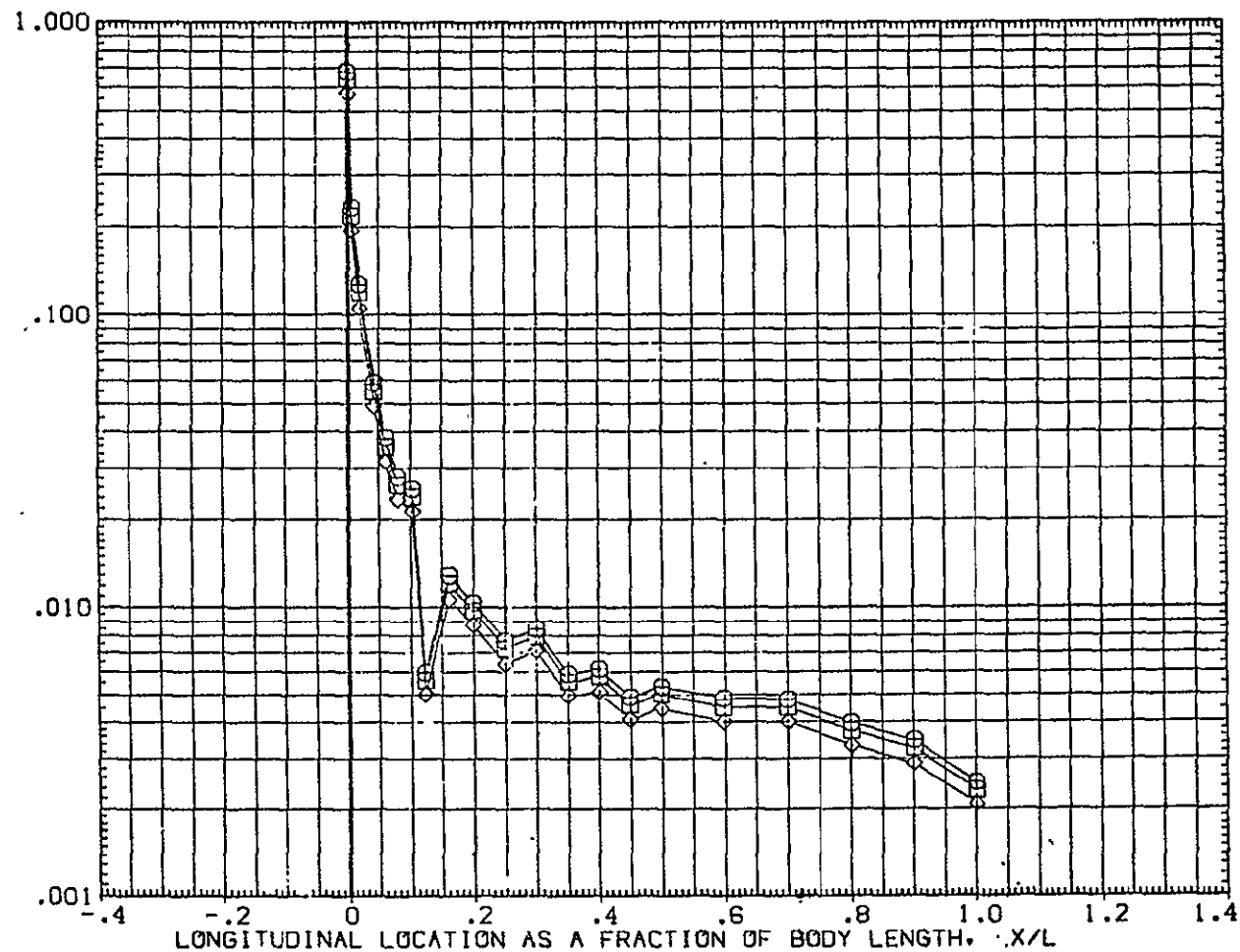


FIG. 10 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER $\alpha = 0$

0H12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB08)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	
○	.850	.000	19.180		5.000		.000
□	.900						
◇	1.000						

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} FIG. 11 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 5$

OH12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB08)

SYMBOL	HAW/HT	PHI	MACH
◇	.850	25.000	19.180
□	.900		
○	1.000		

PARAMETRIC VALUES		
ALPHA	BETA	
5.000		.000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

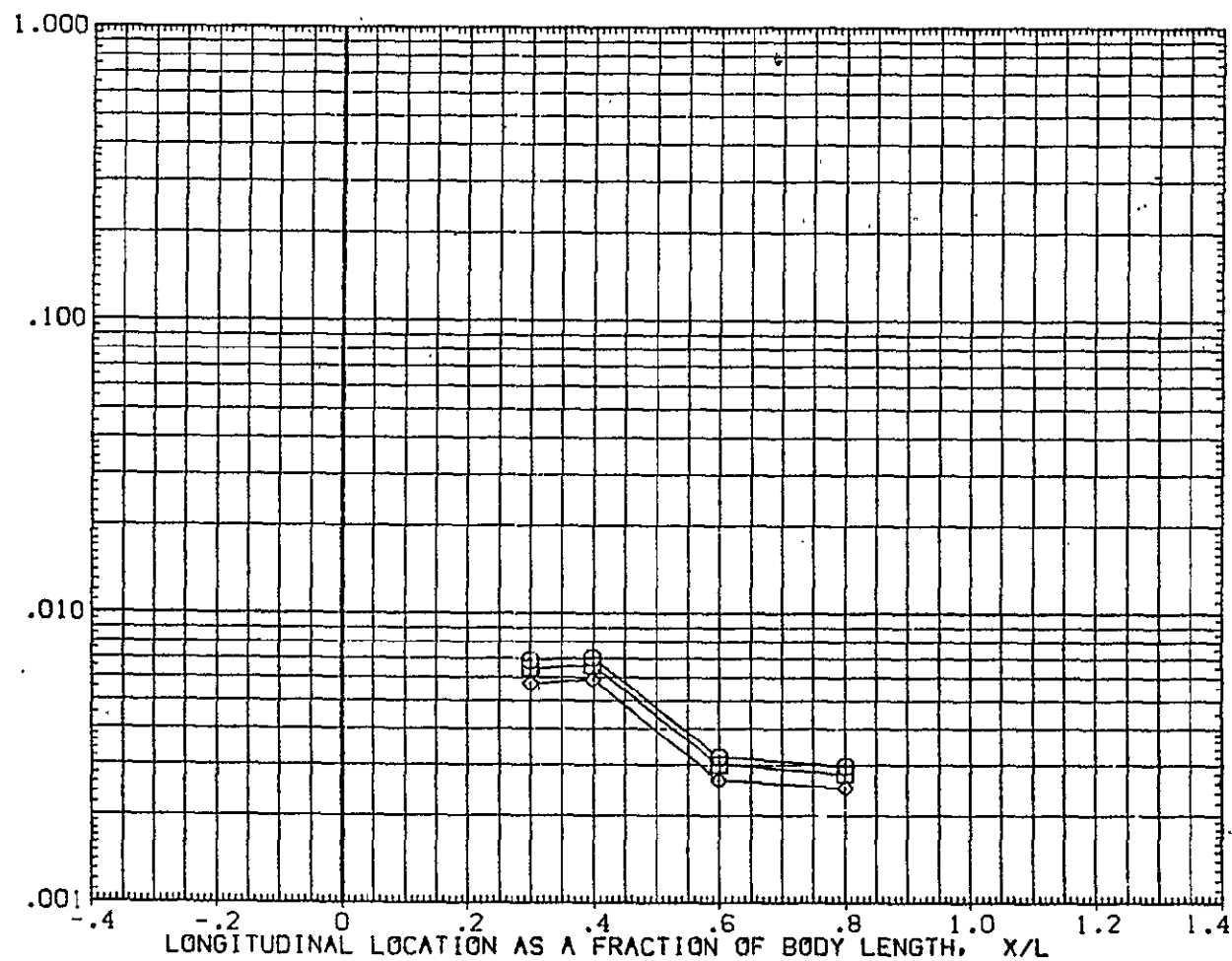
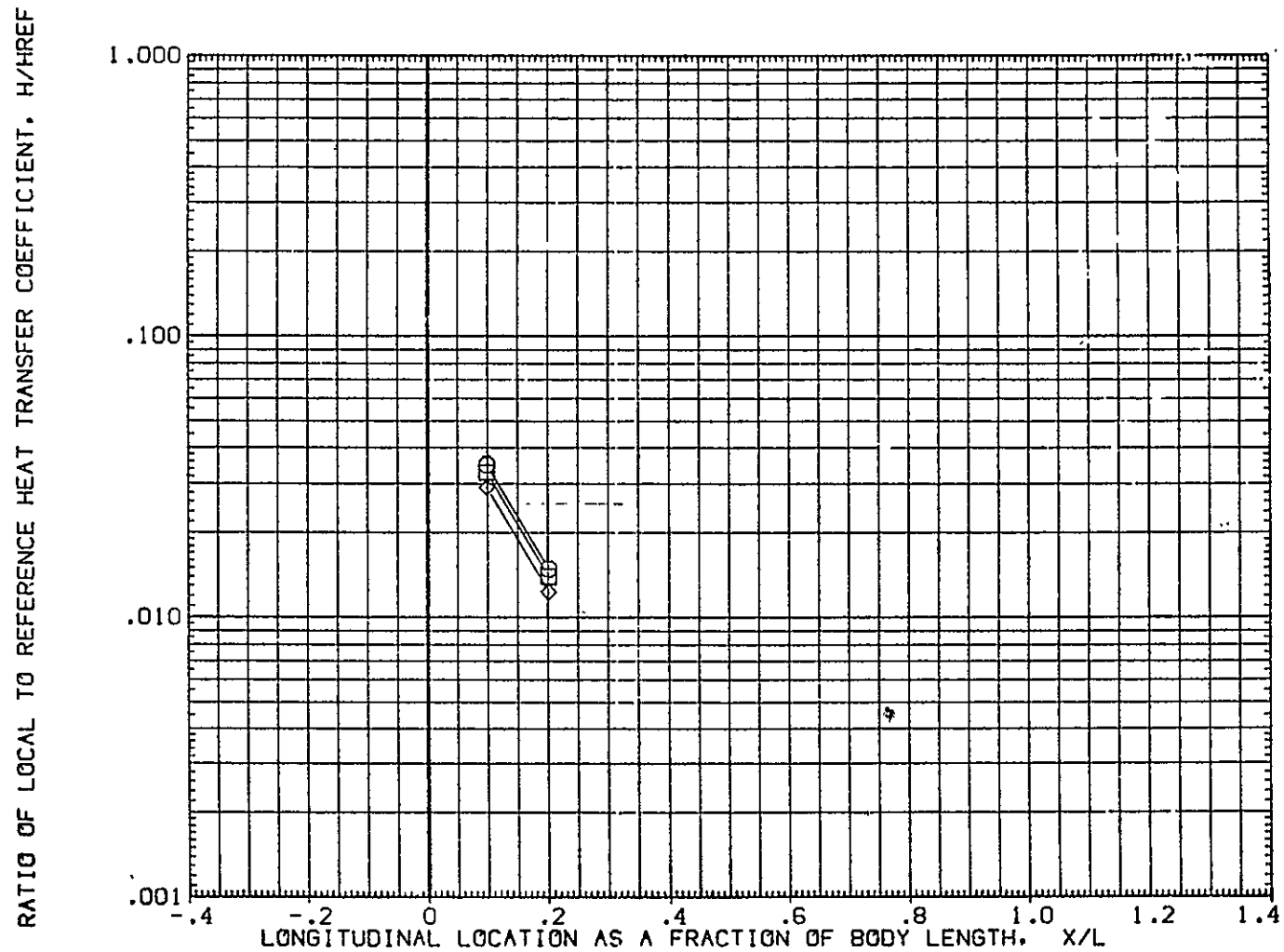


FIG. 11 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 5

0H12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB08)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	.000
□	.850	30.000	19.180				
◇	.900						
◇	1.000						

FIG. 11 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 5$

OH12/IH21 (CAL HST 173-100) 37 0

FUSELAGE (RUGB08)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.850	180.000	19.180	5.000	BETA	.000
□	.900					
◇	1.000					

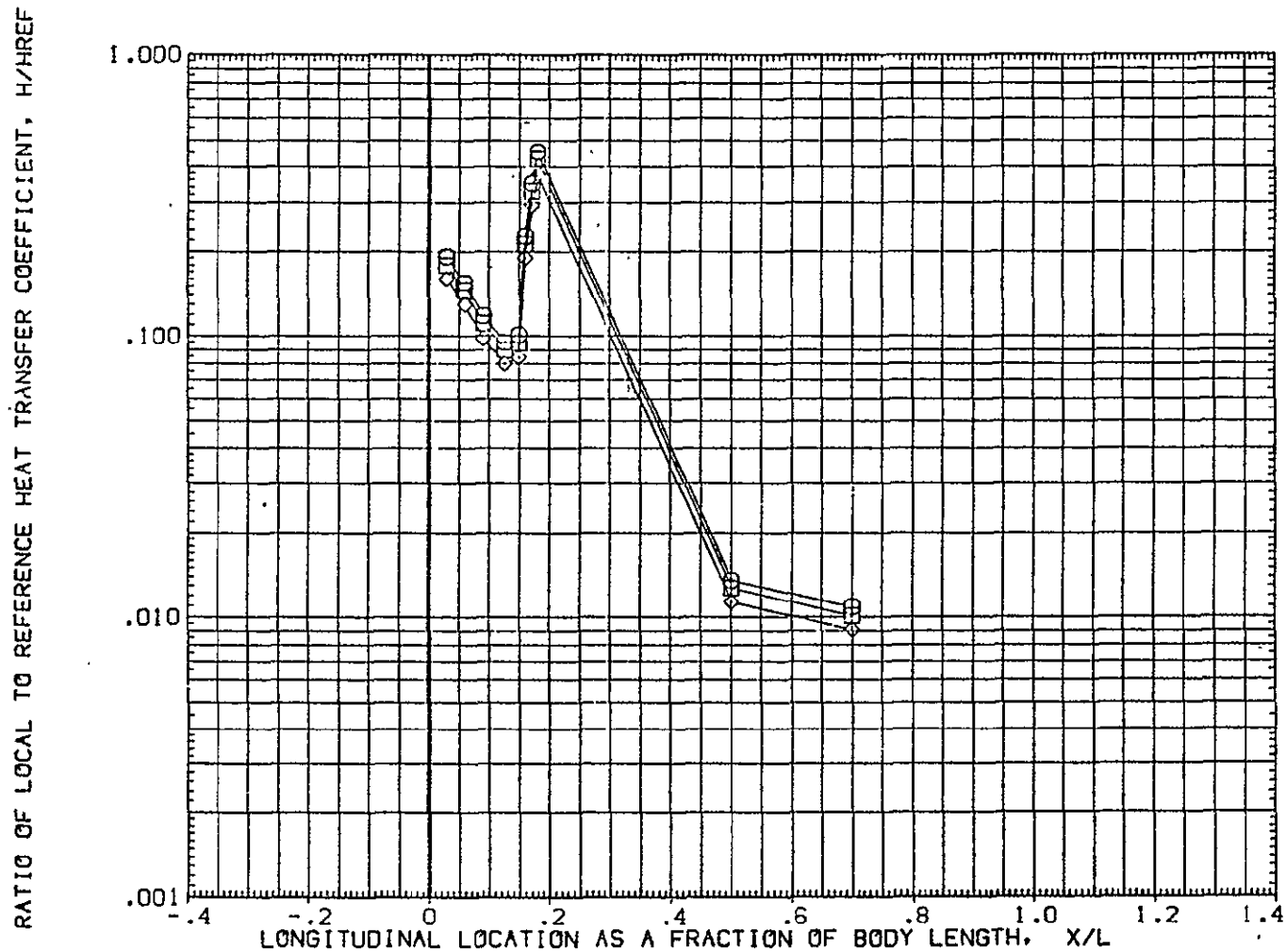


FIG. 11 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 5$

0H12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB06)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES
◇	.850	.000	19.220	ALPHA 5.000 BETA .000
□	.900			
○	1.000			

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

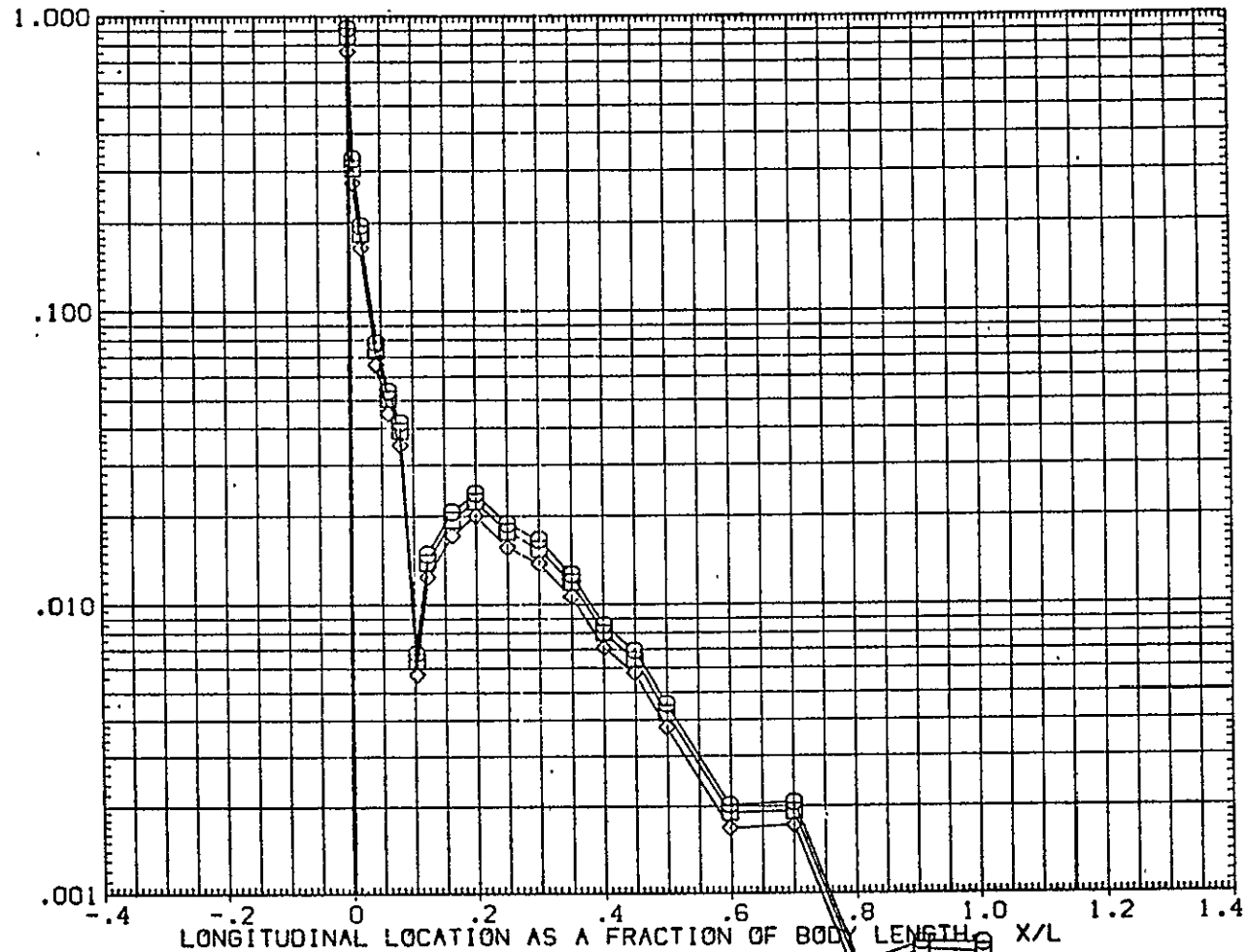


FIG. 11 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 5

5

OH12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB06)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES
○	.850	25.000	19.220	ALPHA 5.000 BETA .000
□	.900			
◇	1.000			

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

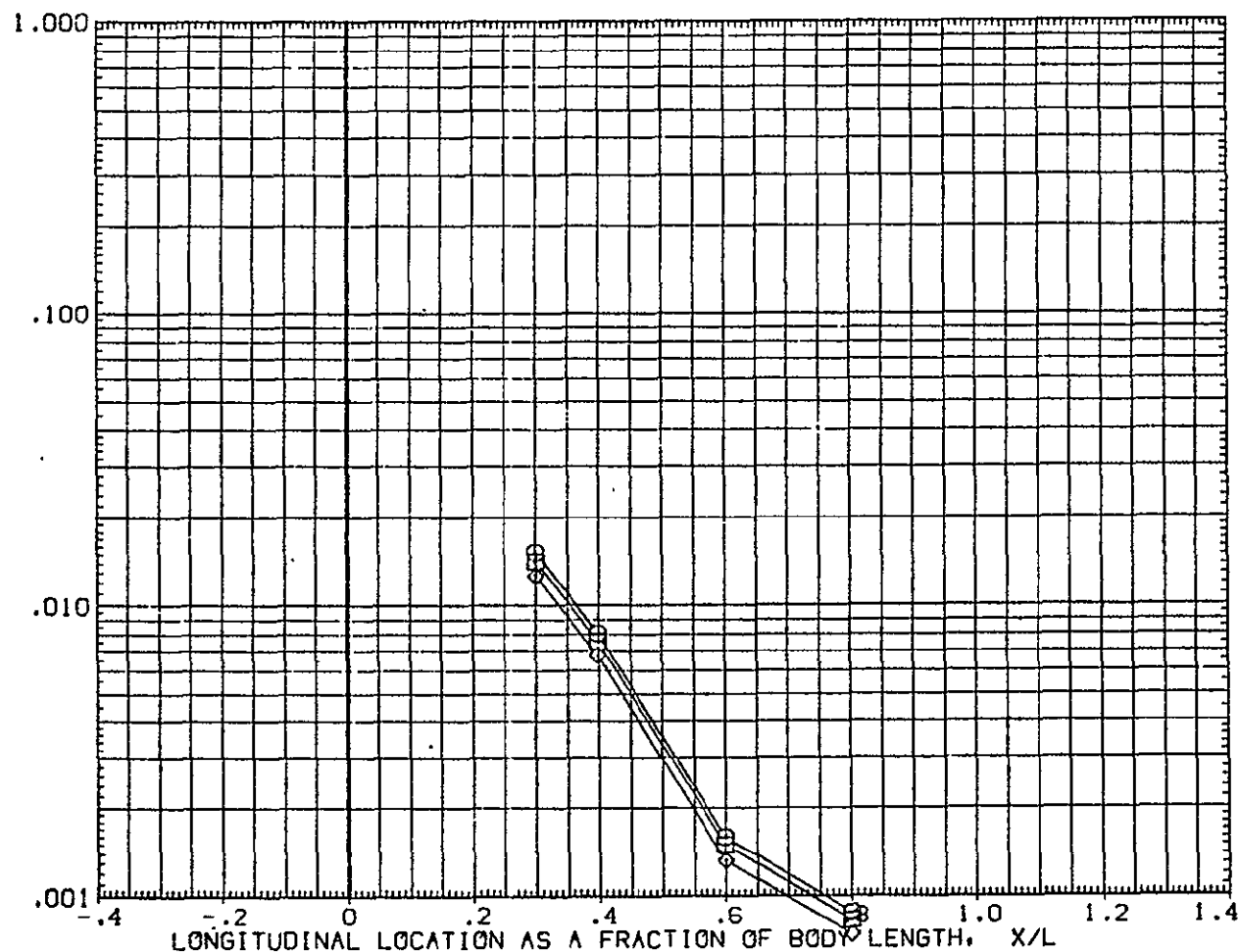


FIG. 11 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 5

0H12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB06)

SYMBOL	HAY/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	30.000	19.220	5.000		.000
◇	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

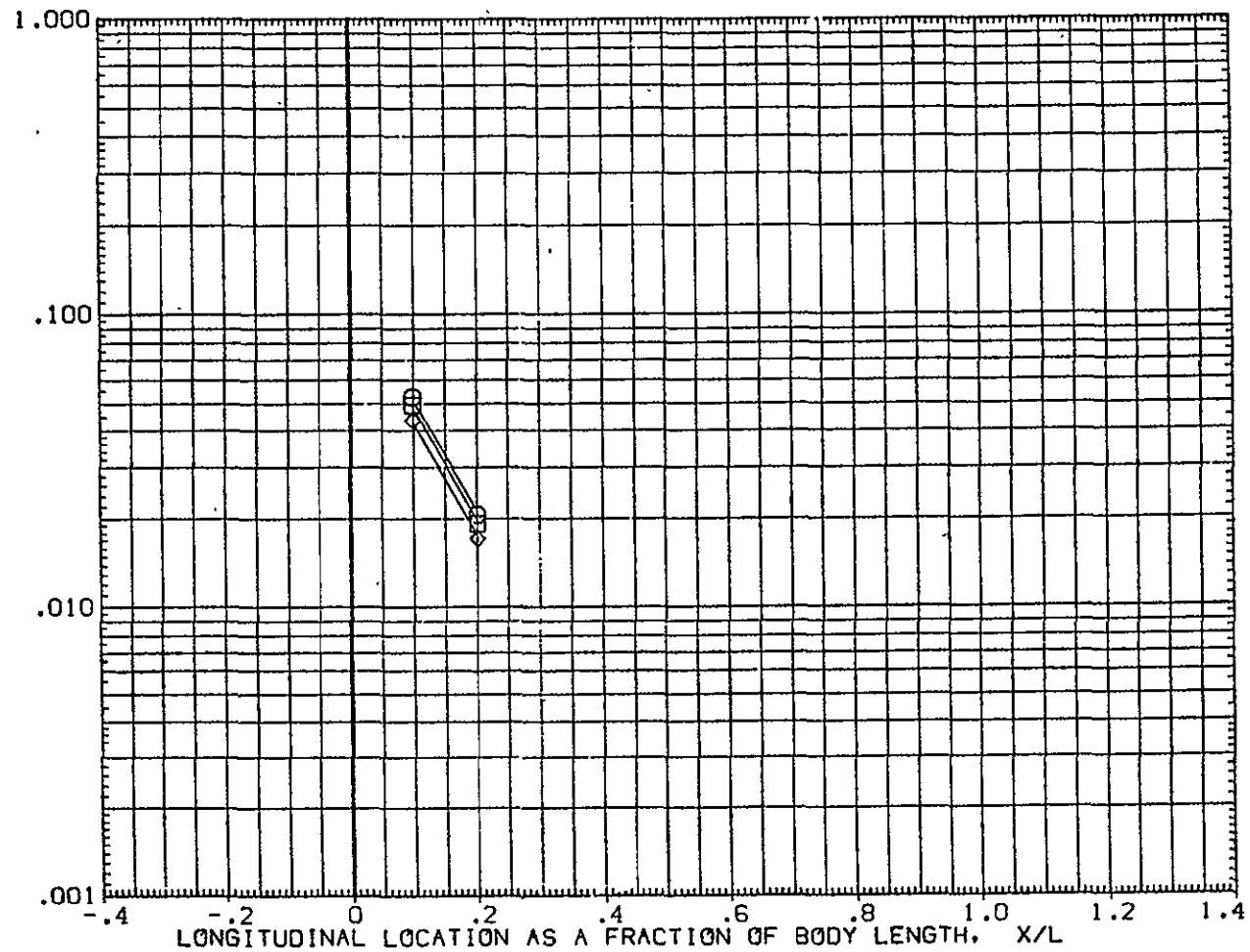


FIG. 11 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 5

OH12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB06)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	
○	.850	180.000	19.220	5.000		.000	
□	.900						
◇	1.000						

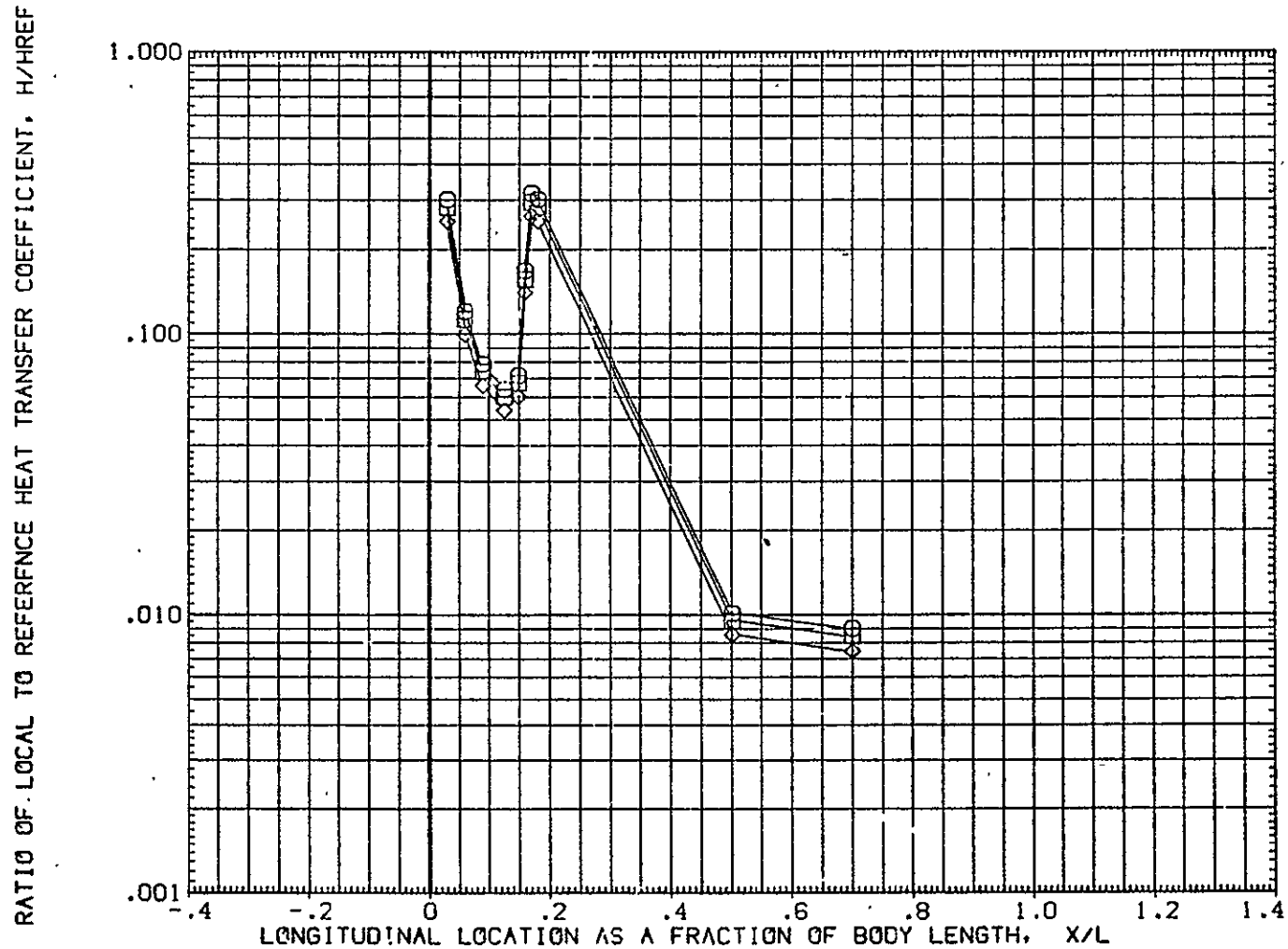


FIG. 11 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 5

OH12 + IH21 MODEL 37 OT(06)/O(08) FUSELAGE (IUGB06)

SYMBOL
O
HAW/HT
.900
PHI
.000
MACH
19.170

PARAMETRIC VALUES
ALPHA
5.000
BETA
.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

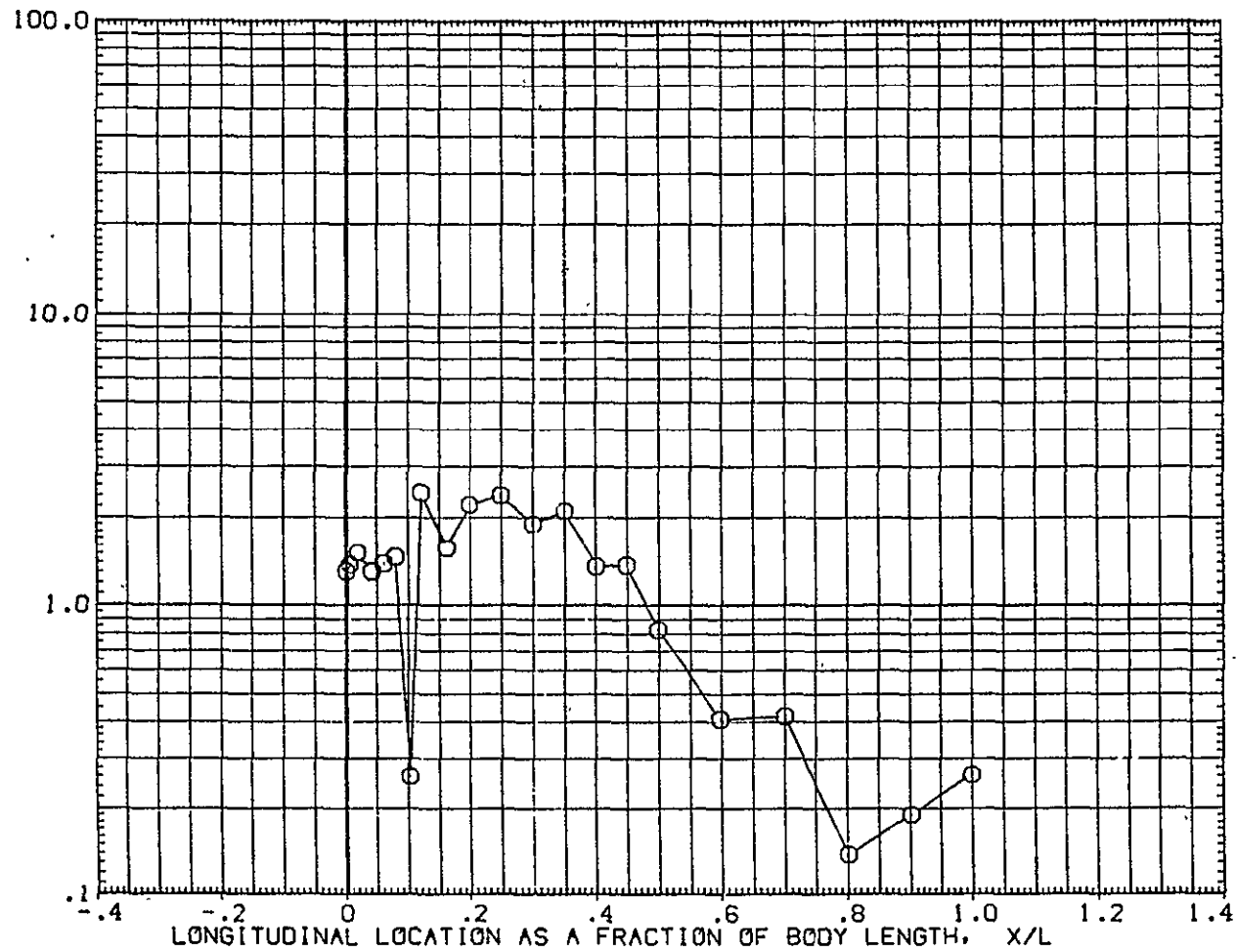


FIG. 11 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 5

OH12 + IH21 MODEL 37 OT(06)/O(08) FUSELAGE (IUGB06)

SYMBOL
O HAW/HT .900 PHI 25.000 MACH 19.170

PARAMETRIC VALUES
ALPHA 5.000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

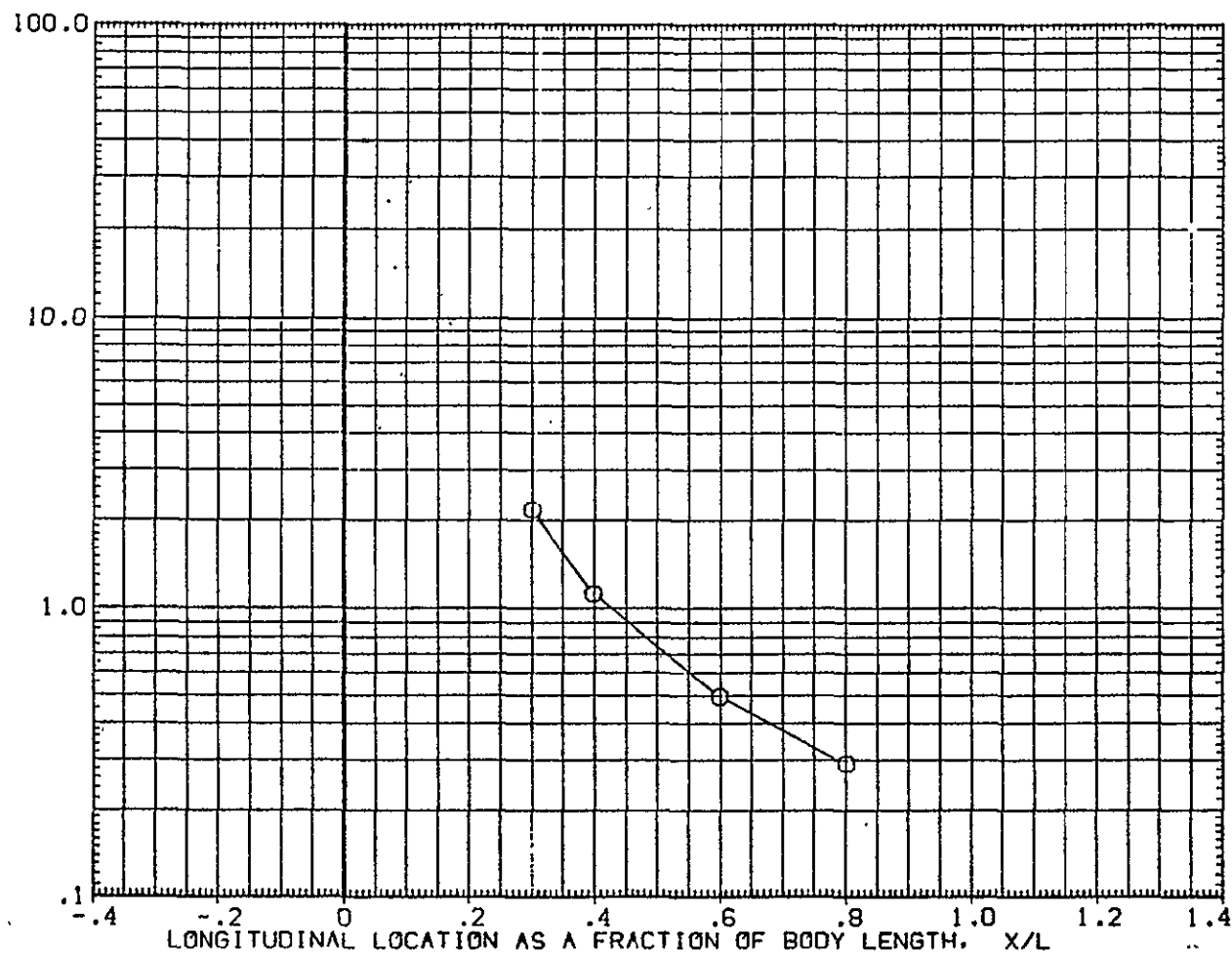


FIG. 11 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 5

OH12 + IH21 MODEL 37 OT(06)/O(08) FUSELAGE (IUGB06)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES
O	.900	30.000	19.170	ALPHA 5.000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

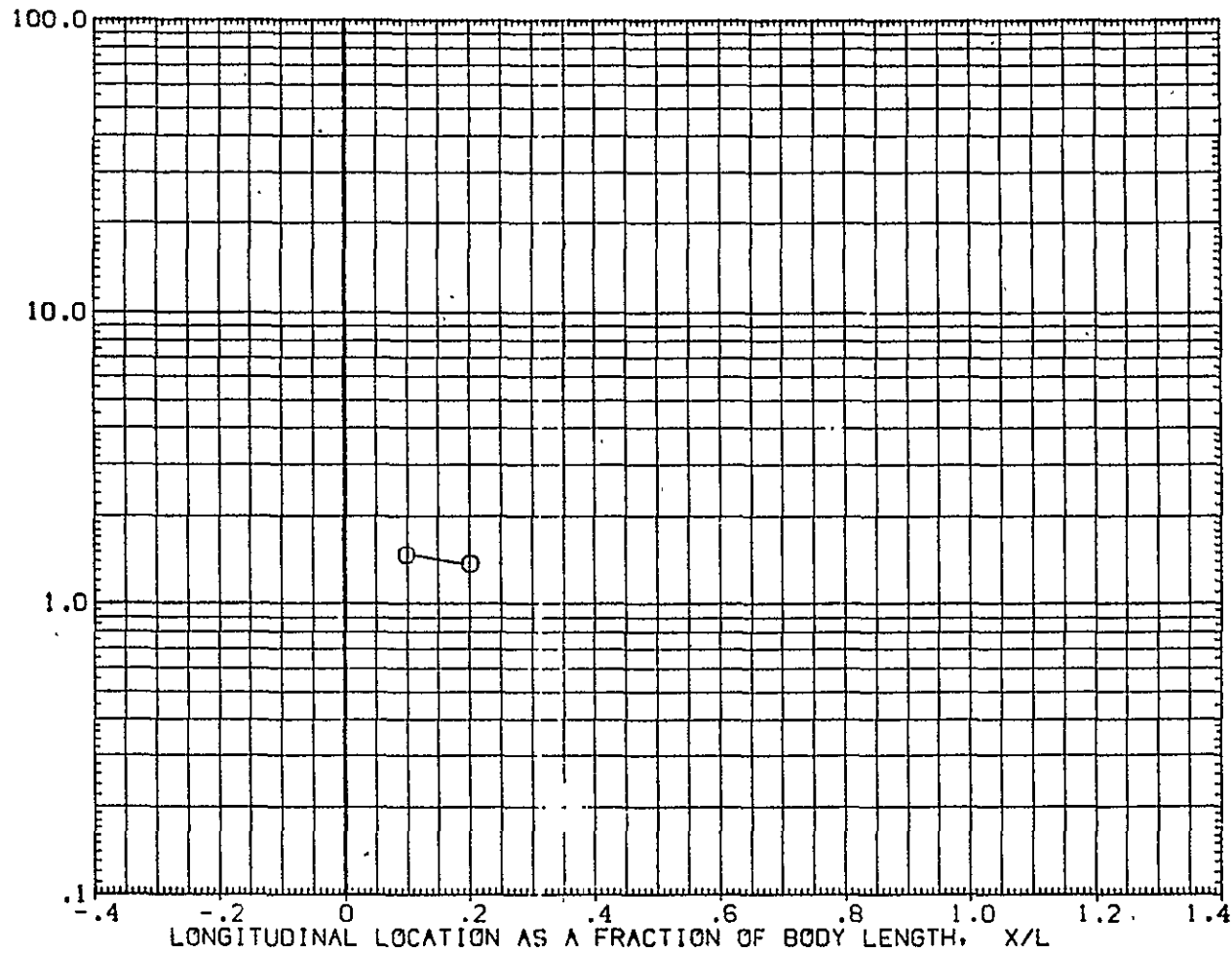


FIG. 11 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 5

OH12 + IH21 MODEL 37 OT(06)/O(08) FUSELAGE (IUGB06)

SYMBOL	MAV/HT	PHI	MACH		PARAMETRIC VALUES
○	.900	180.000	19.170	ALPHA	5.000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

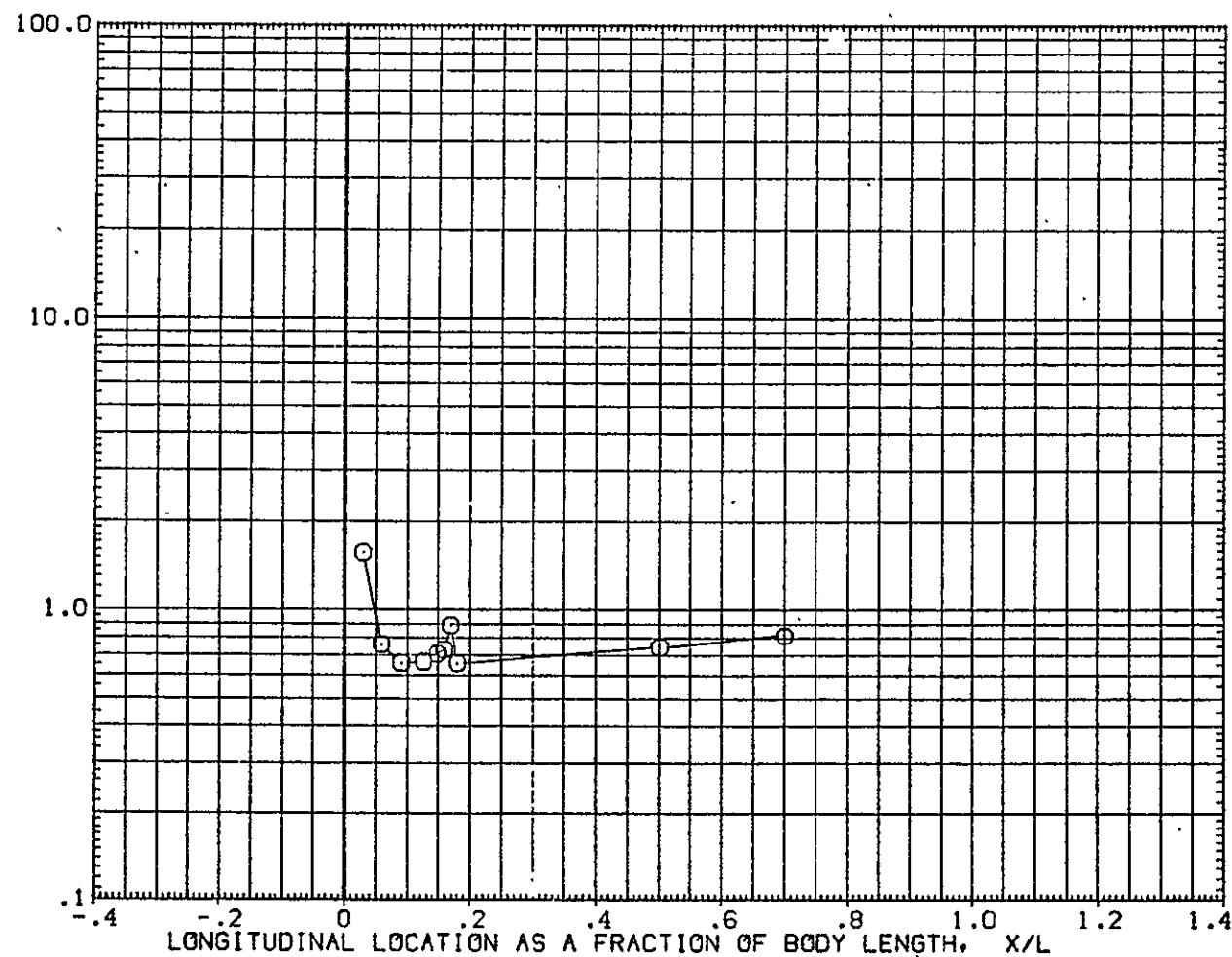


FIG. 11 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 5

OH12/IH21 (CAL HST 173-100) 37 0

WING L.S.(RUGW08)

SYMBOL	HAW/HT	ZY/B	MACH	PARAMETRIC VALUES		
□	.850	.250	19.180	ALPHA	5.000	BETA .000
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

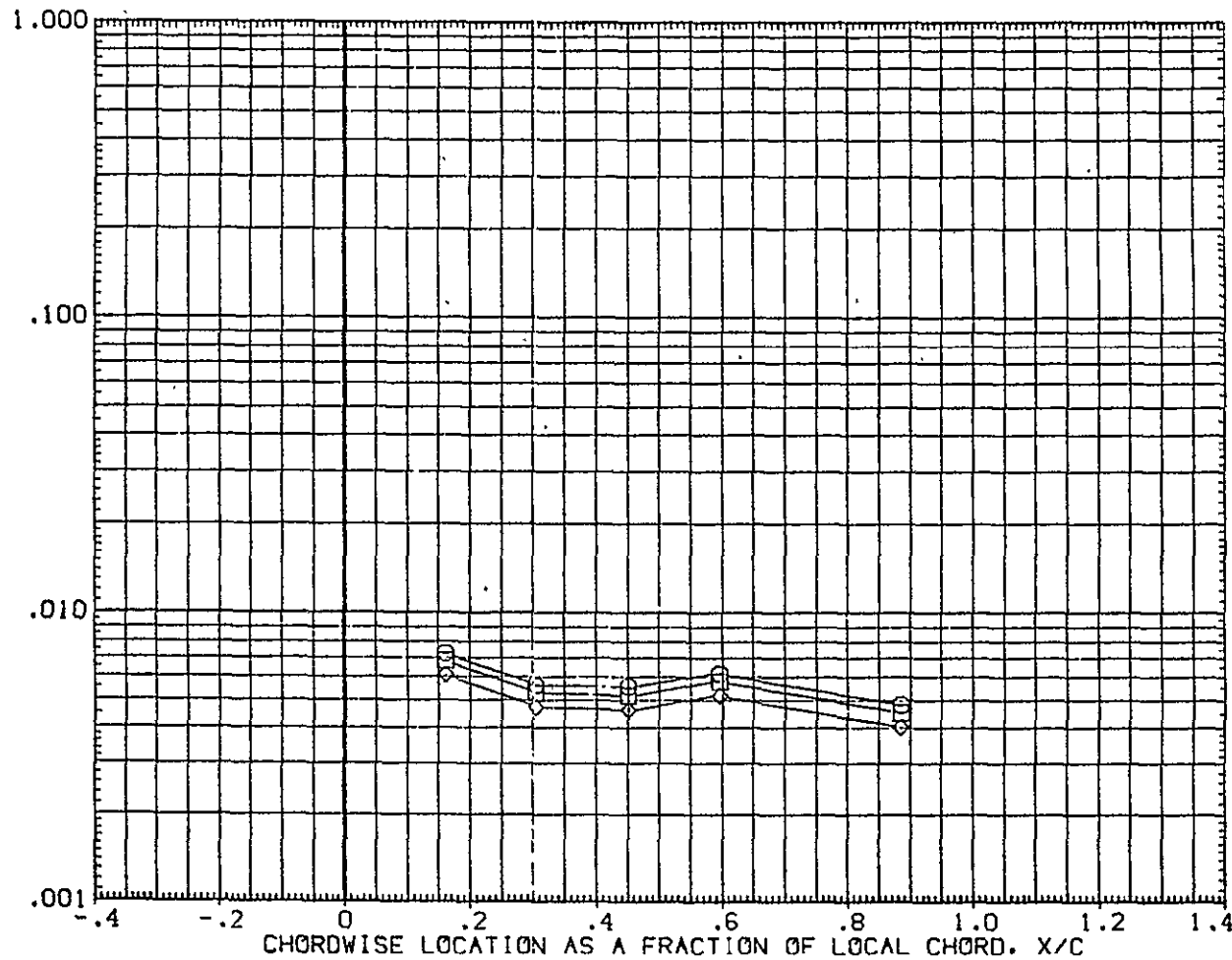


FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

0H12/IH21 (CAL HST 173-100) 37 0

WING L.S.(RUGW08)

SYMBOL
 \diamond \square \circ

HAW/HT
 .850
 .900
 1.000

ZY/B
 .400

MACH
 19.180

PARAMETRIC VALUES
 ALPHA 5.000 BETA .000

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

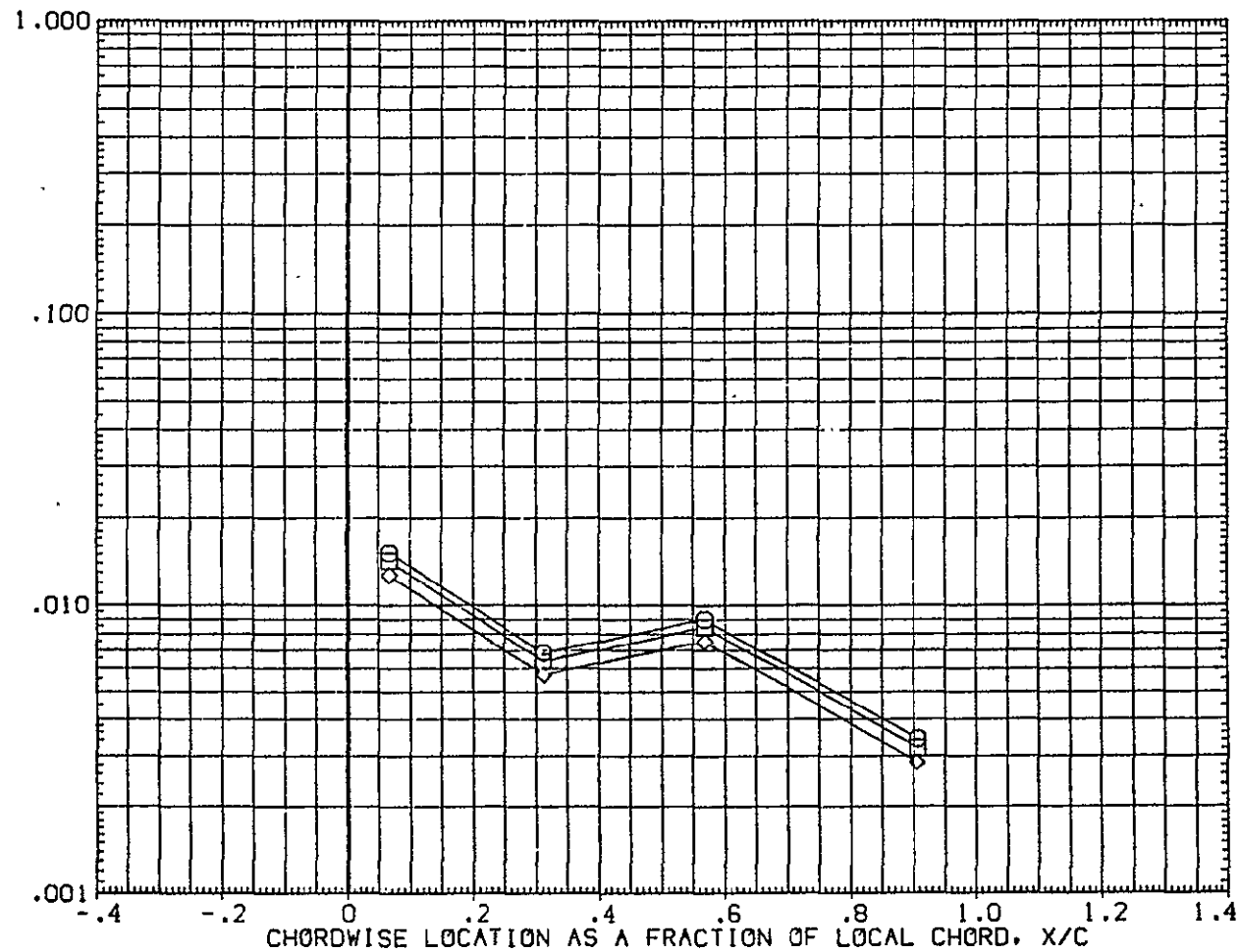
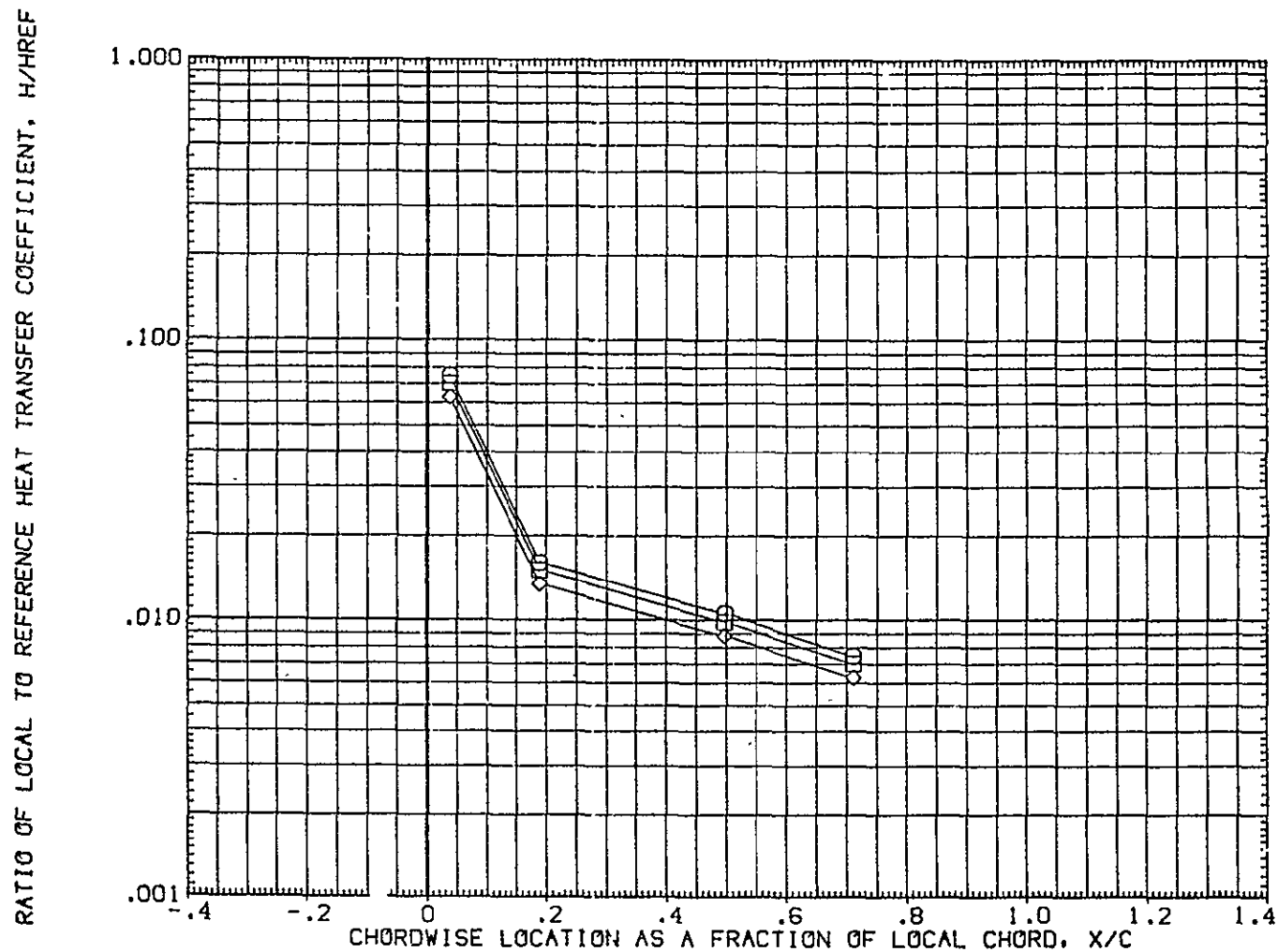


FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

OH12/IH21 (CAL HST 173-100) 37 0

WING 'L.S.(RUGW08)

SYMBOL	HAW/HT	2Y/B	MACH	ALPHA	PARAMETRIC VALUES	
○	.850	.500	19.180	5.000	BETA	.000
□	.900					
◇	1.000					

FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 5$

CH12/IH21 (CAL HST 173-100) 37 0

WING L.S.(RUGW08)

SYMBOL	HAW/HT	2Y/B	MACH	ALPHA	PARAMETRIC VALUES		BETA	.000
○	.850	.600	19.180		5.000			
□	.900							
◇	1.000							

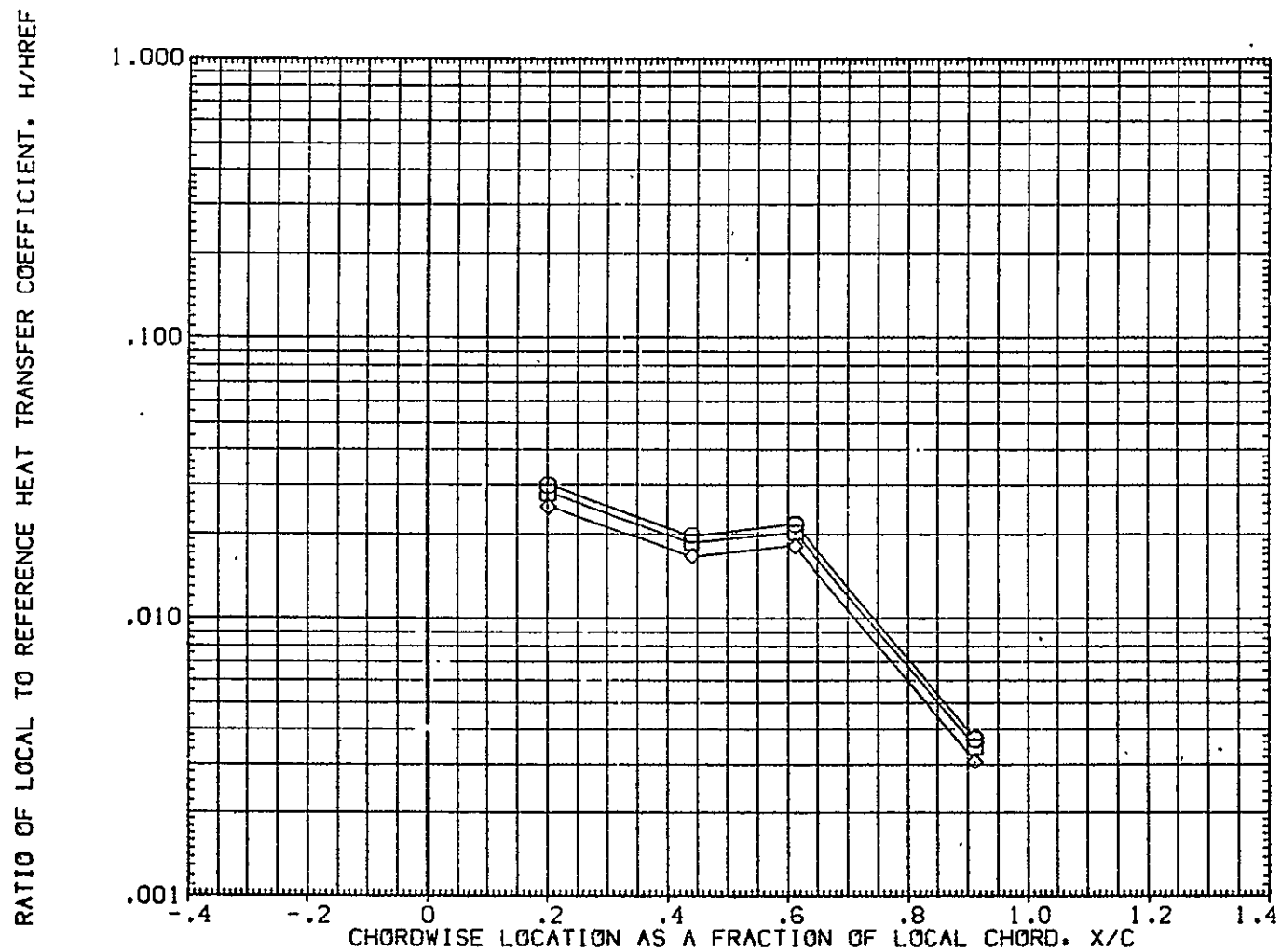


FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

0H12/IH21 (CAL HST 173-100) 3' 0

WING L.S.(RUGW08)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
○	.850	.750	19.180	ALPHA	5.000	BETA
□	.900					.000
◇	1.000					

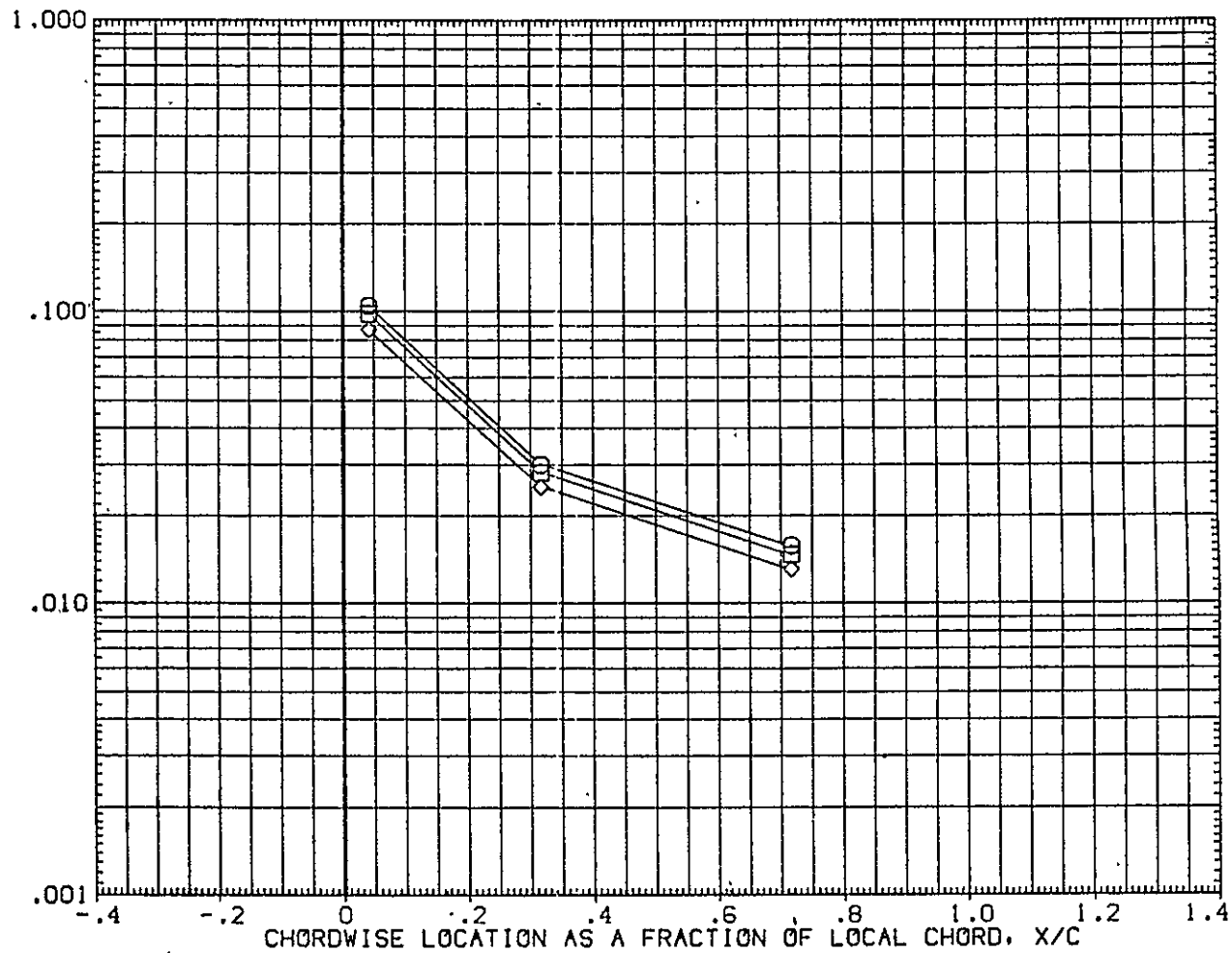
RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF} 

FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

OH12/IH21 (CAL HST 173-100) 37 0

WING L.S.(RUGW08)

SYMBOL	RAW/HT	2Y/B	MACH	ALPHA	PARAMETRIC VALUES		BETA	
○	.850	.950	19.180		5.000			.000
□	.900							
◇	1.000							

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

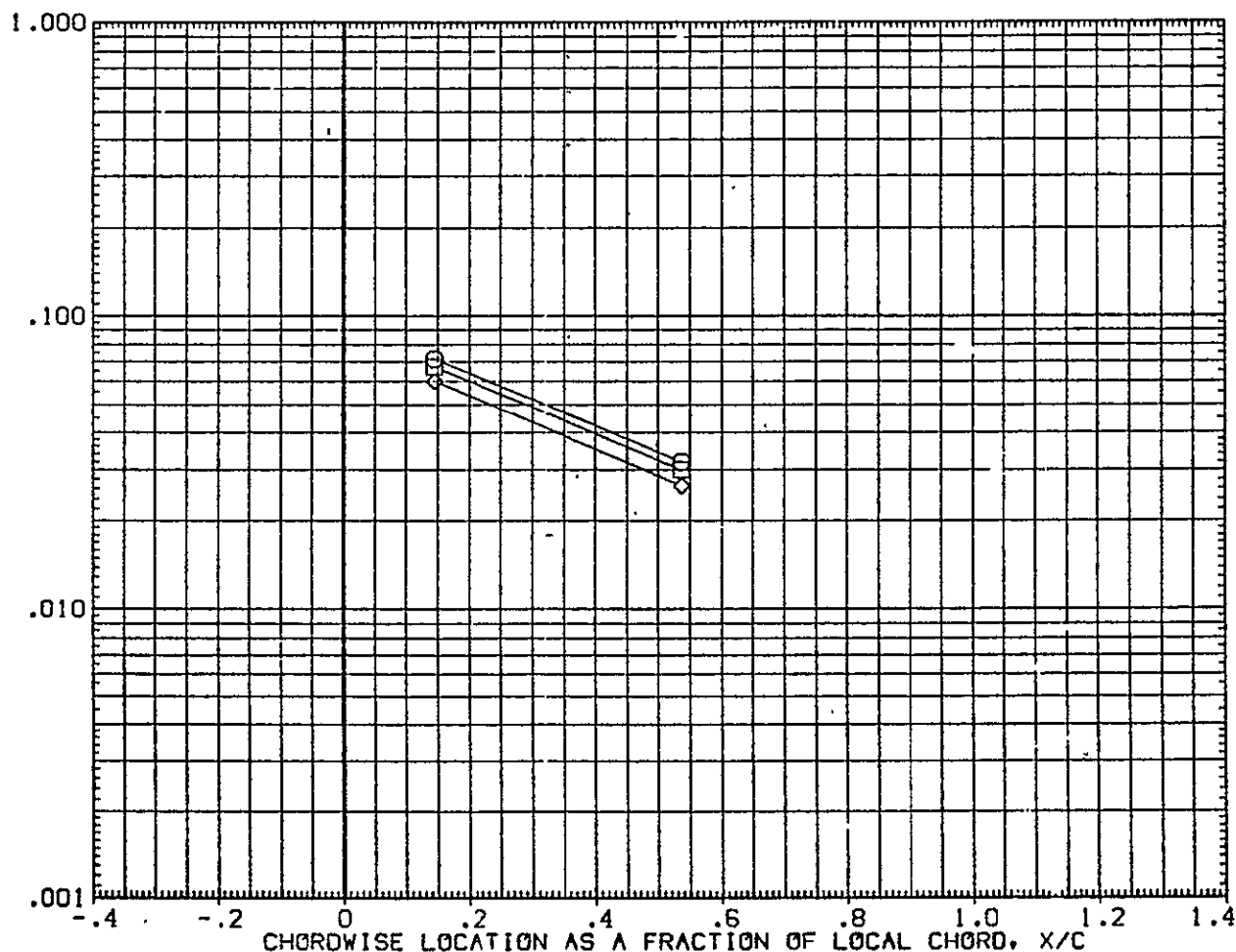


FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

0H12/1H21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW06)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES
◇	.850	.250	19.220	ALPHA 5.000 BETA .000
□	.900			
○	1.000			

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

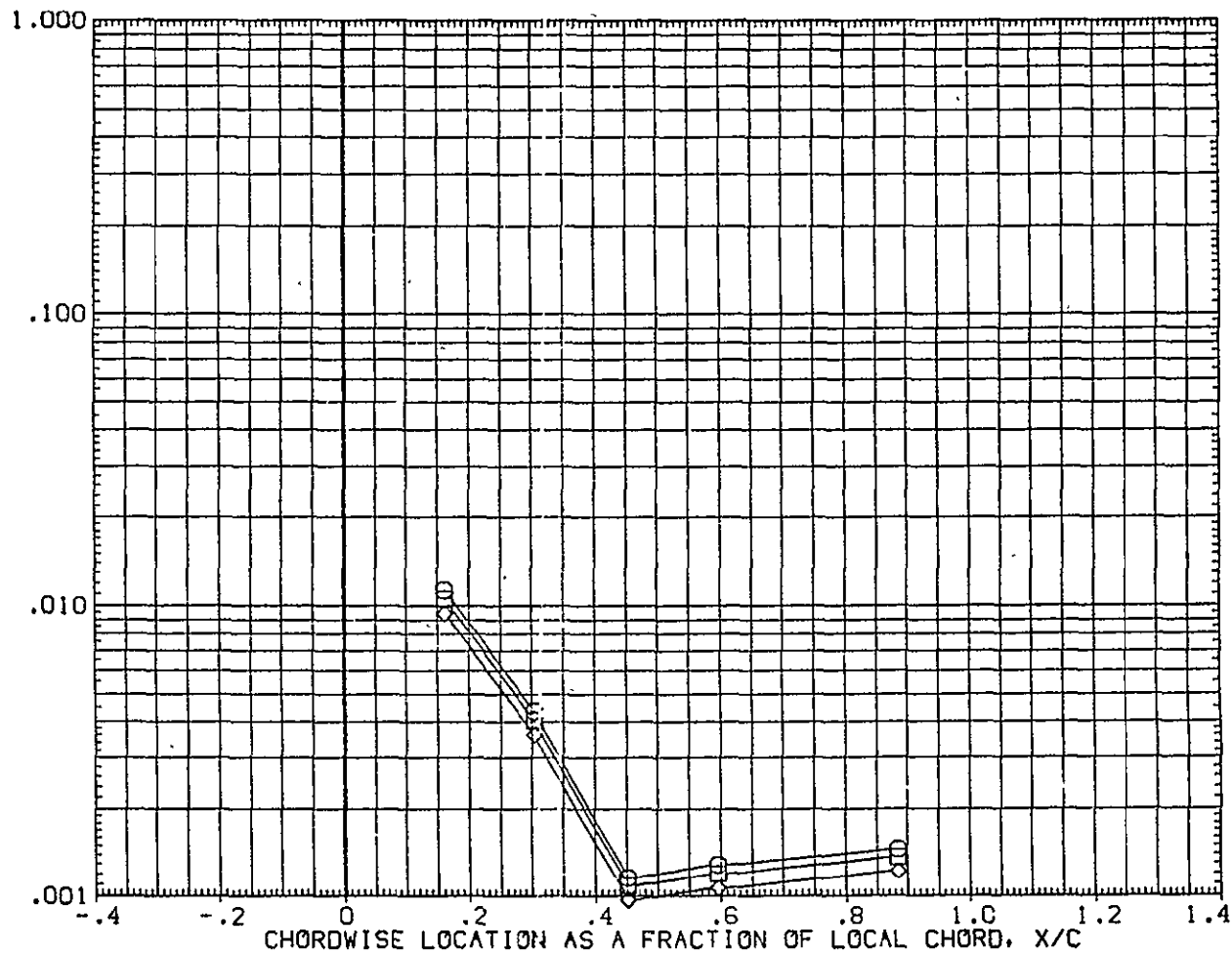


FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

0H12/1H21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW06)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
○	.850	.400	19.220	ALPHA	5.000	BETA
□	.900					.000
◇	1.000					

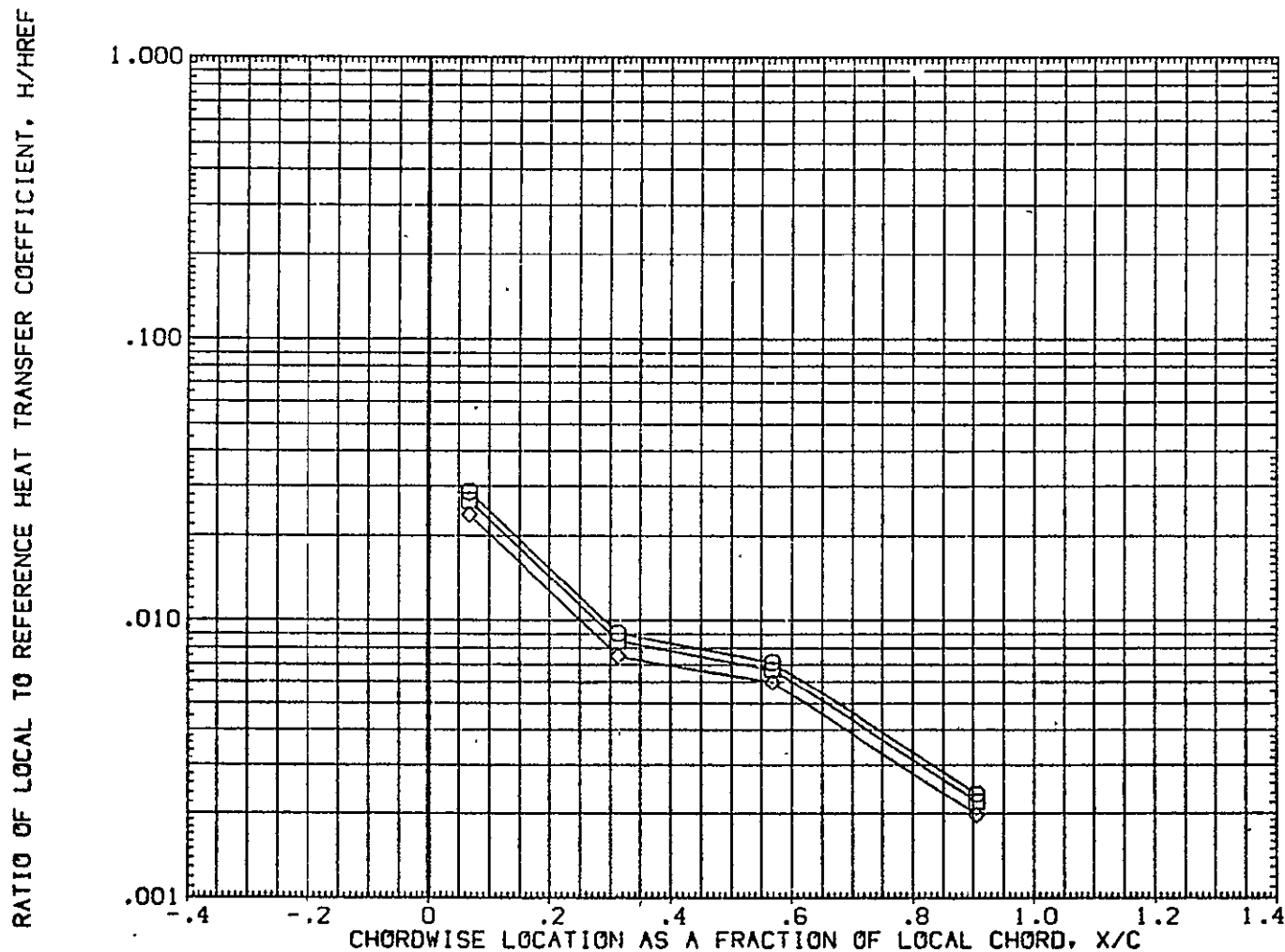


FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

0H12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW06)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	.500	19.220	5.000		
◻	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

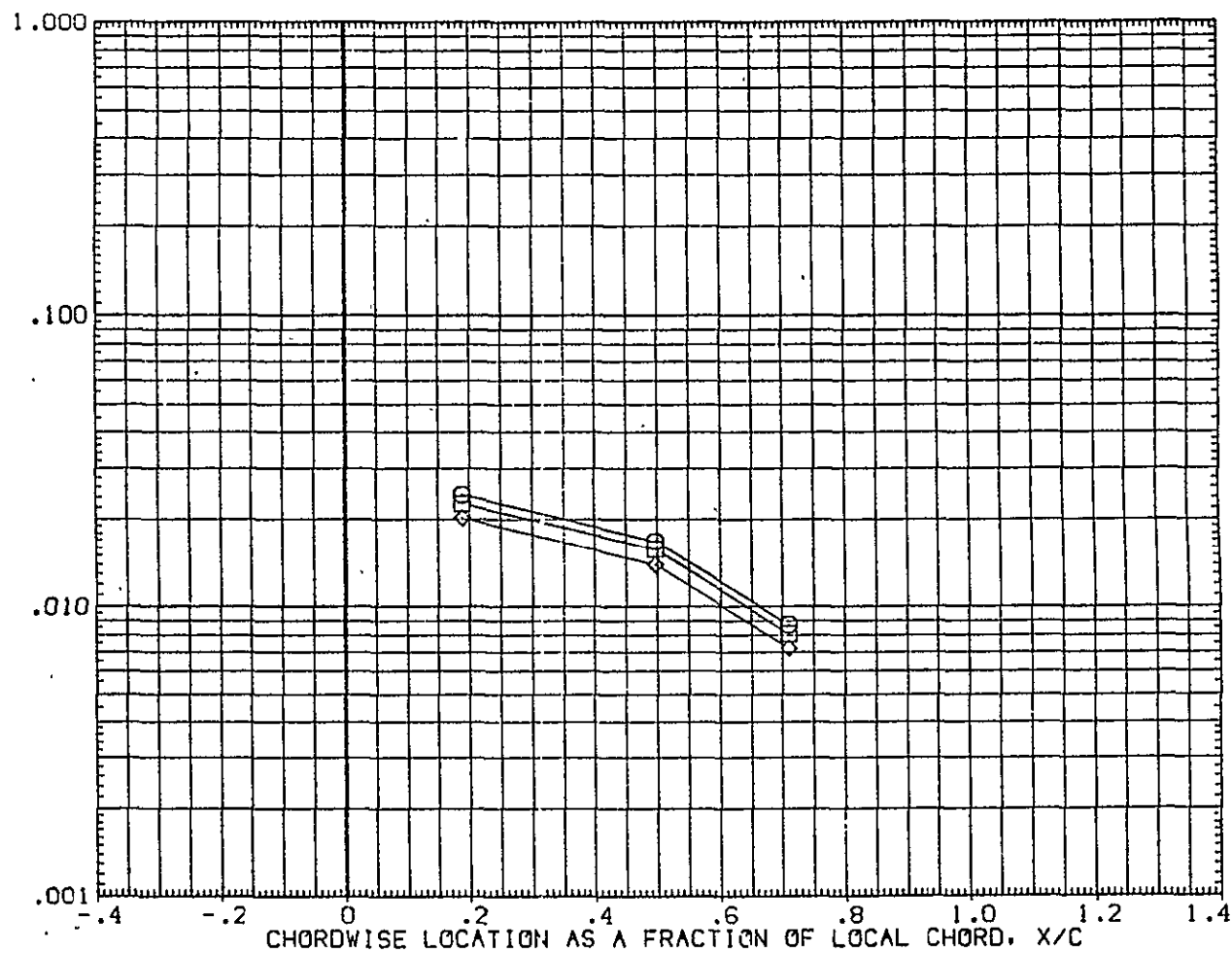


FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

0H12/1H21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW06)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES
□	.850	.600	19.220	ALPHA 5.000 BETA .000
□	.900			
◇	1.000			

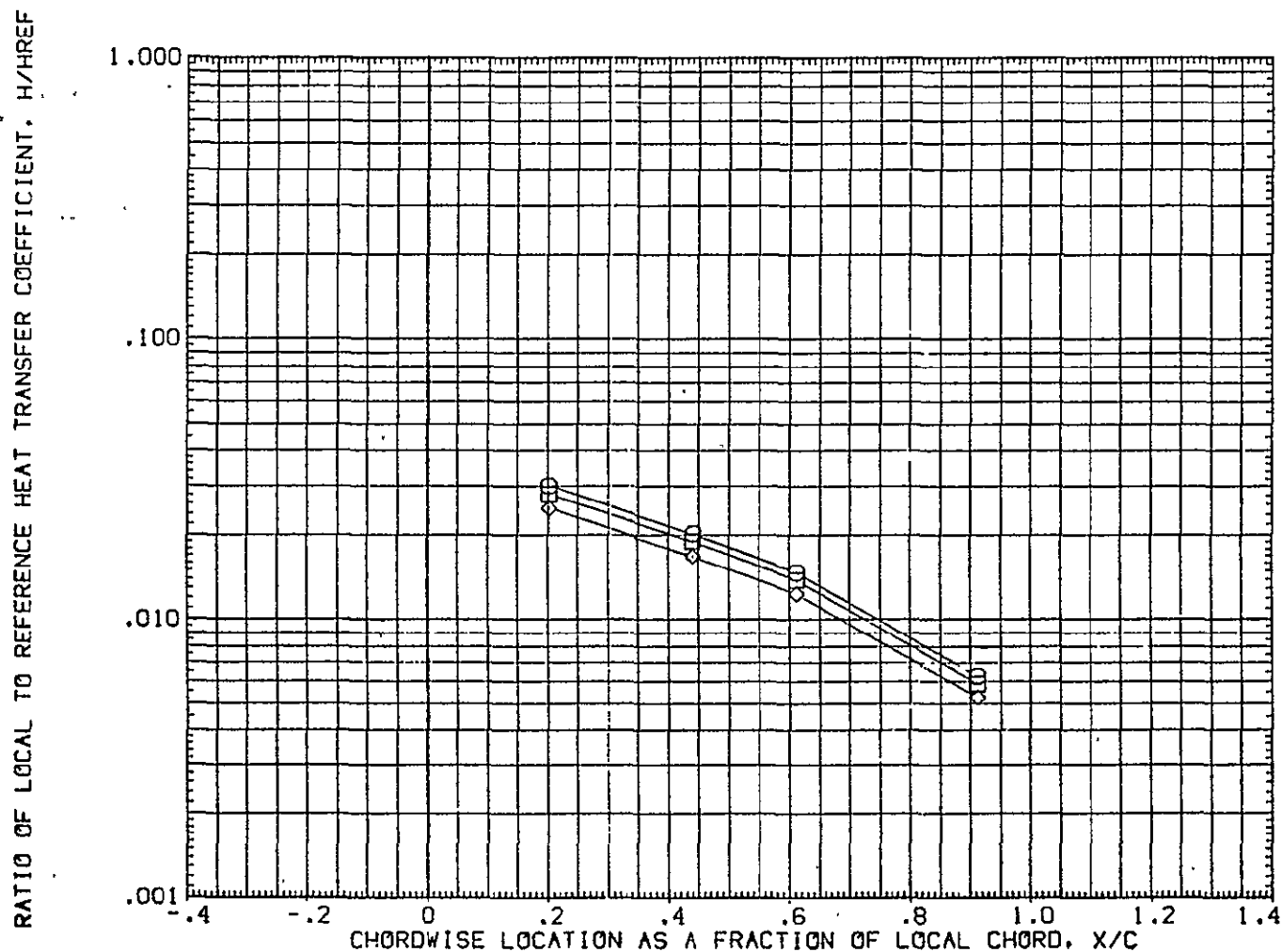


FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

0H12/IH21 (CAL HST I73-100) 37 0 T WING L.S.(RUGW06)

SYMBOL	HAW/HT	2Y/B	MACH	ALPHA	PARAMETRIC VALUES	BETA	.000
◇	.850	.750	19.220				
□	.900						
○	1.000						

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

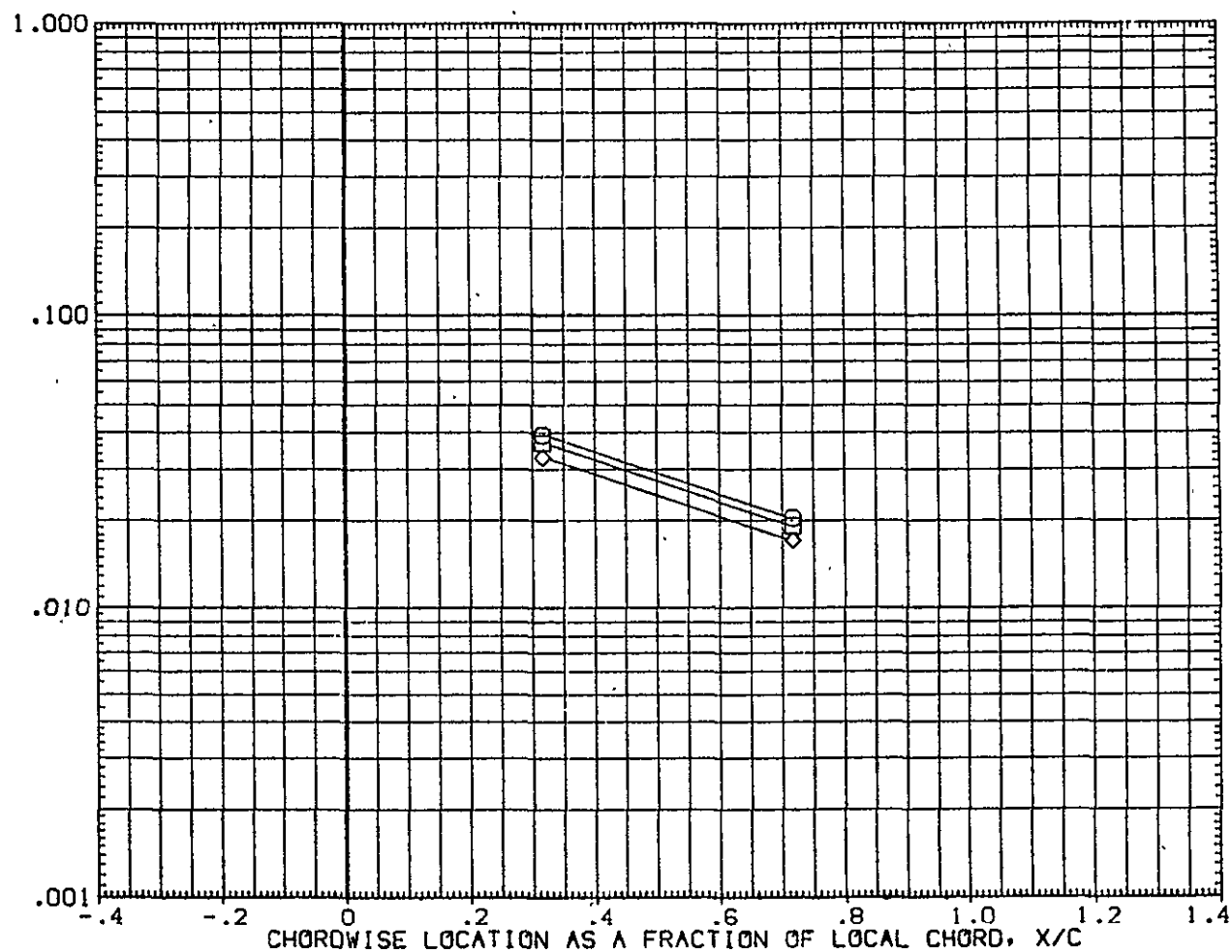


FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

OH12/IH21 (CAL HST I73-100) 37 0 T WING L.S.(RUGW06)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES
○	.850	.950	19.220	ALPHA 5.000 BETA .000
□	.900			
◇	1.000			

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

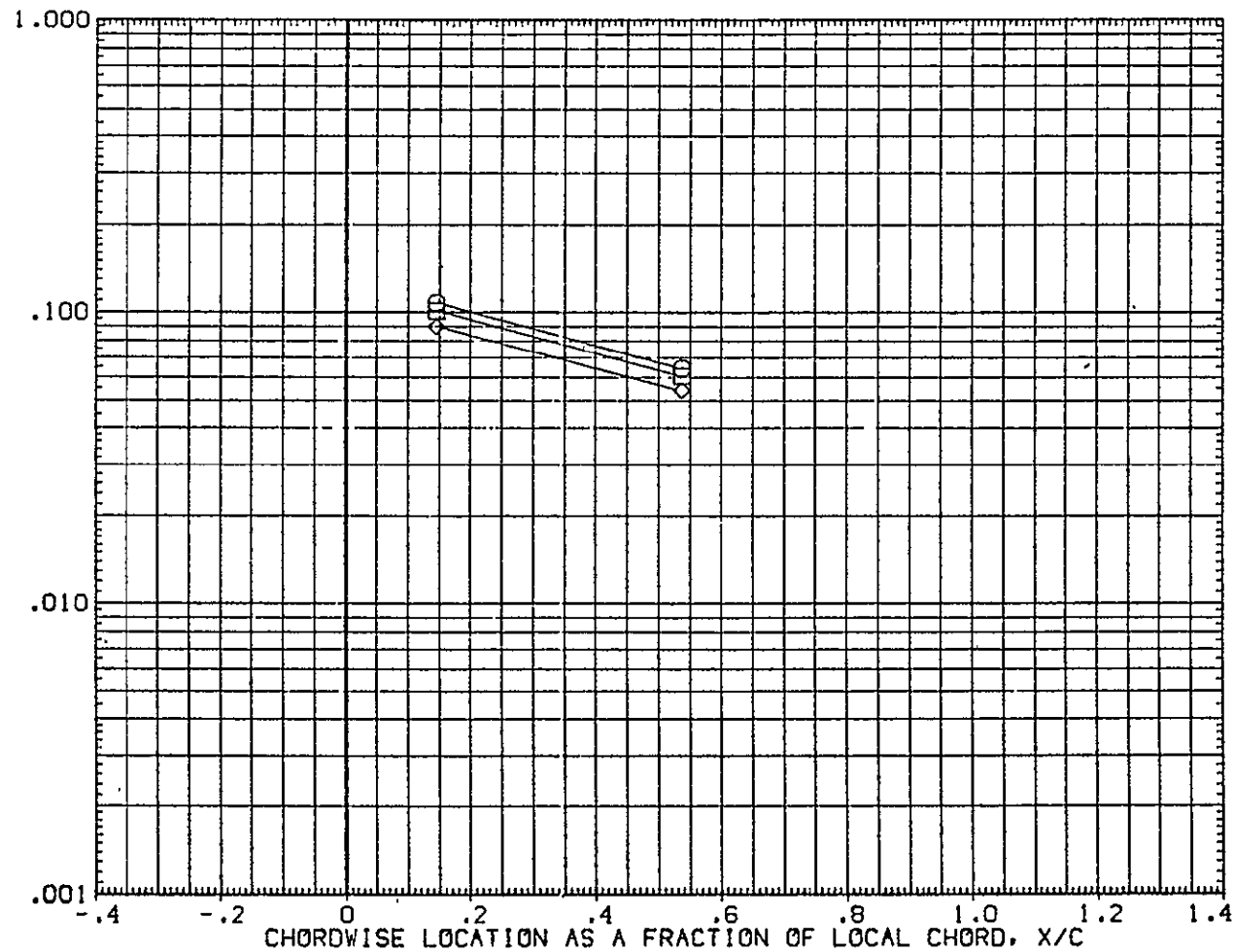


FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

0H12 + IH21 MODEL 37 0T(06)/0(08) WING L.S. (IUGW06)

SYMBOL
O
HAW/HT
.900
2Y/B
.250
MACH
19.170

PARAMETRIC VALUES
ALPHA
5.000
BETA
.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

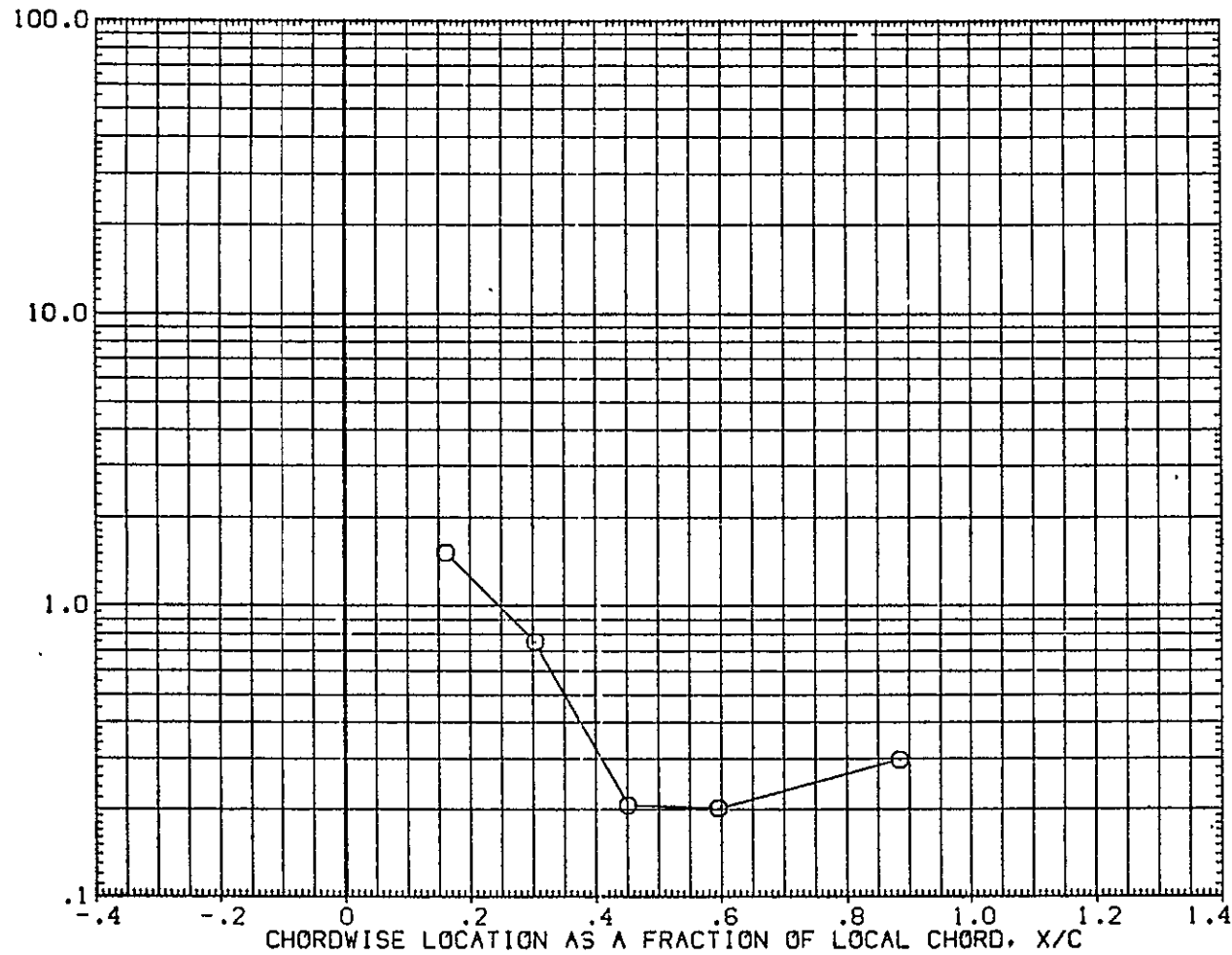


FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

OH12 + IH21 MODEL 37 OT(06)/O(08) WING L.S. (IUGW06)

SYMBOL	HAW/HT	ZY/B	MACH	ALPHA	PARAMETRIC VALUES	BETA	
○	.900	.400	19.170	5.000			.000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

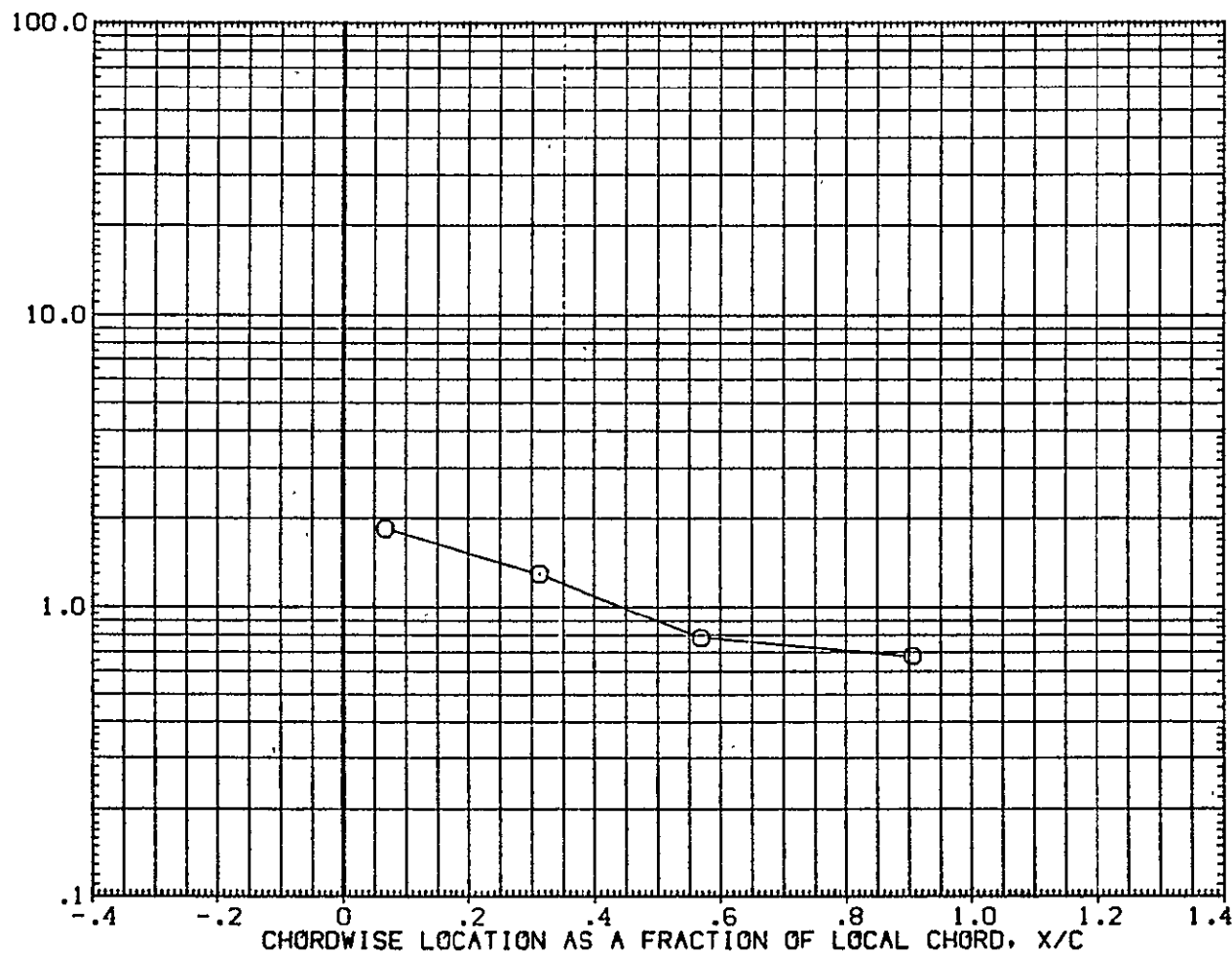


FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

OH12 + IH21 MODEL 37 OT(06)/O(08) WING L.S. (IUGW06)

SYMBOL
O
HAW/HT
.900
2Y/B
.500
MACH
19.170

PARAMETRIC VALUES
ALPHA 5.000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

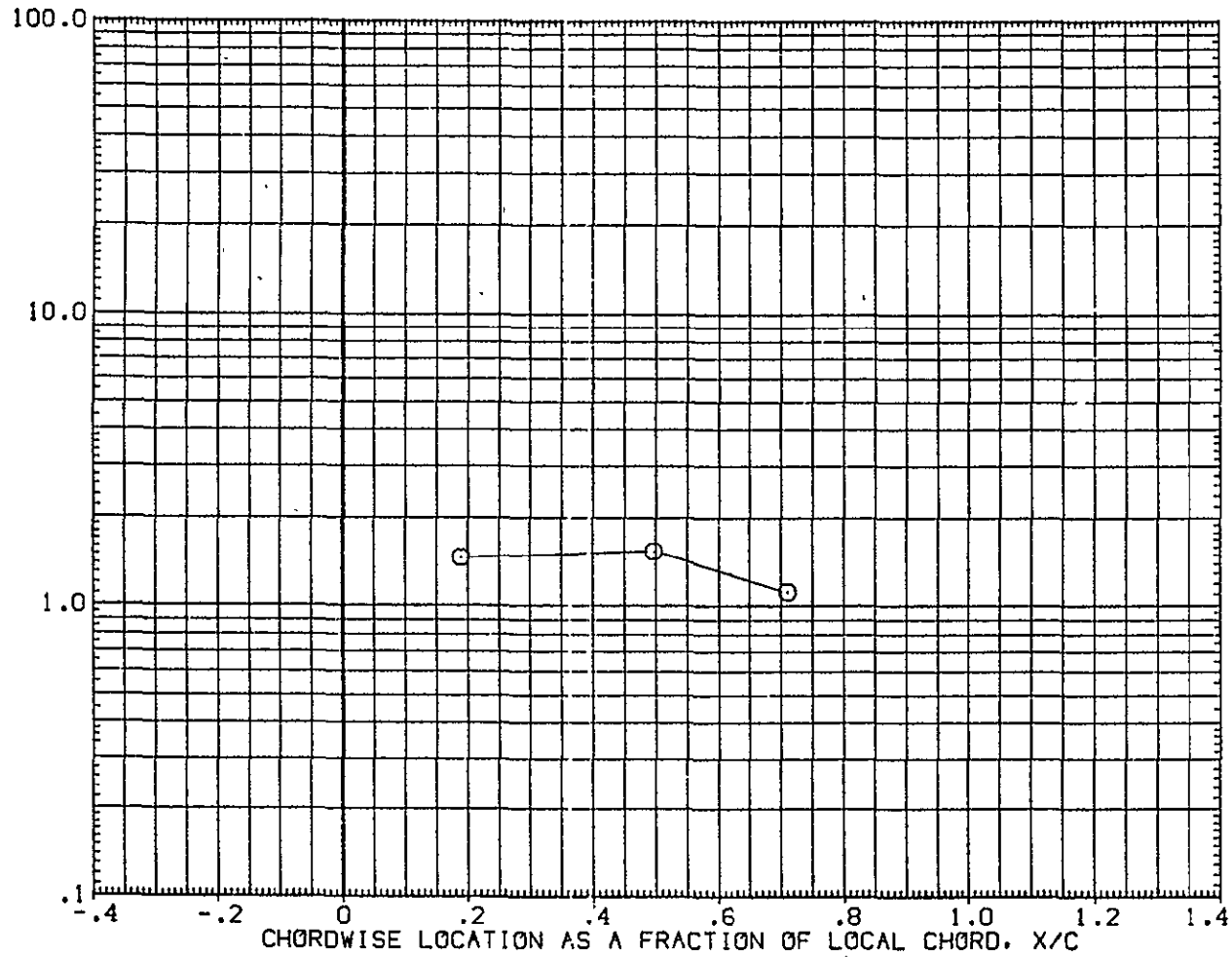


FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

0H12 + 1H21 MODEL 37 OT(06)/O(08) WING L.S. (JUGW06)

SYMBOL	HAW/HT	2Y/B	MACH	ALPHA	PARAMETRIC VALUES	BETA	.000
○	.900	.600	19.170	5.000			

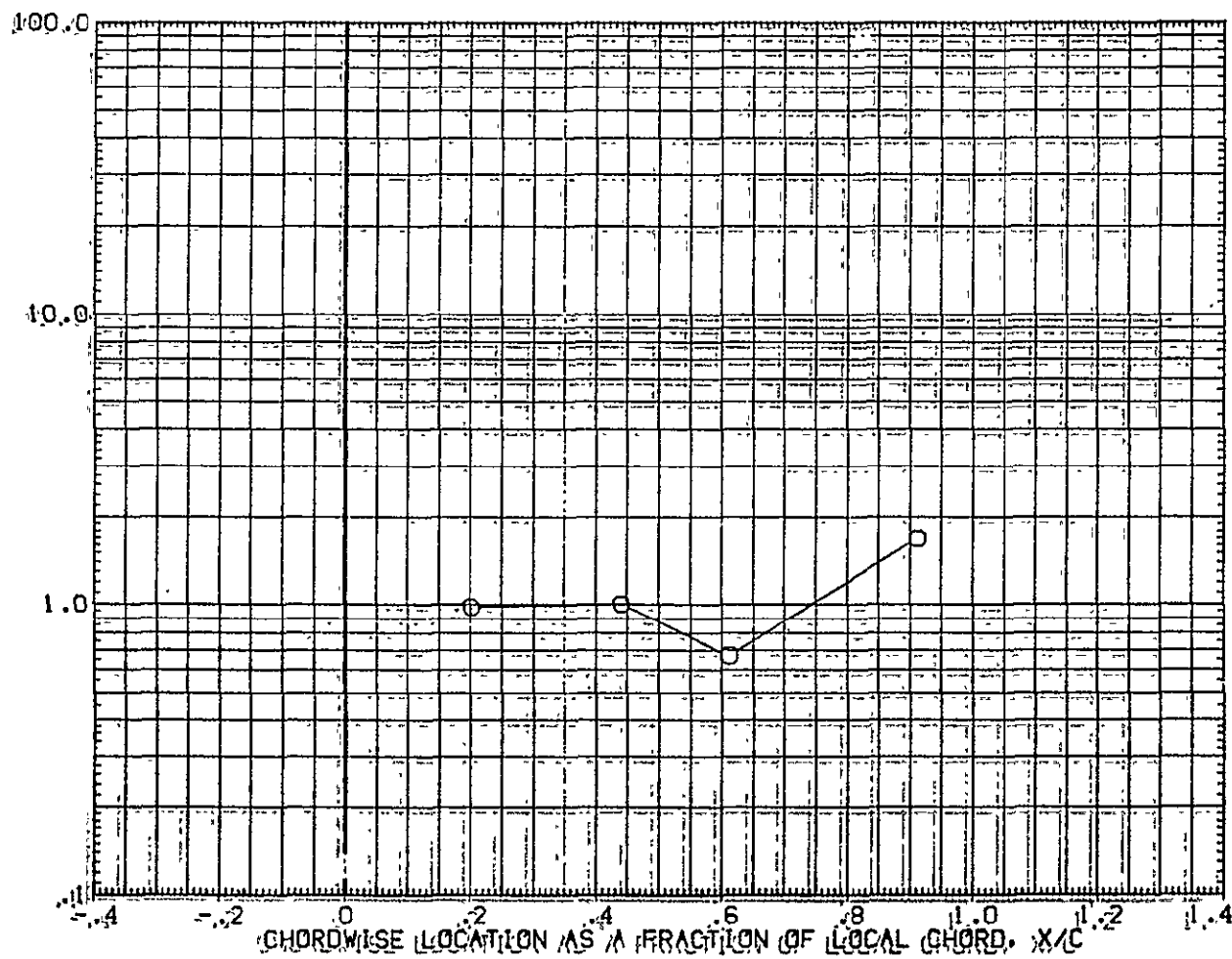


FIG. 112 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

REPRODUCIBILITY OF THE
ORIGINAL PAGE IS POOR

0H12 + 1H21 MODEL 37 0T(06)/0(08) WING L.S. (IUGW06)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
○	.900	.750	19.170	ALPHA	5.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

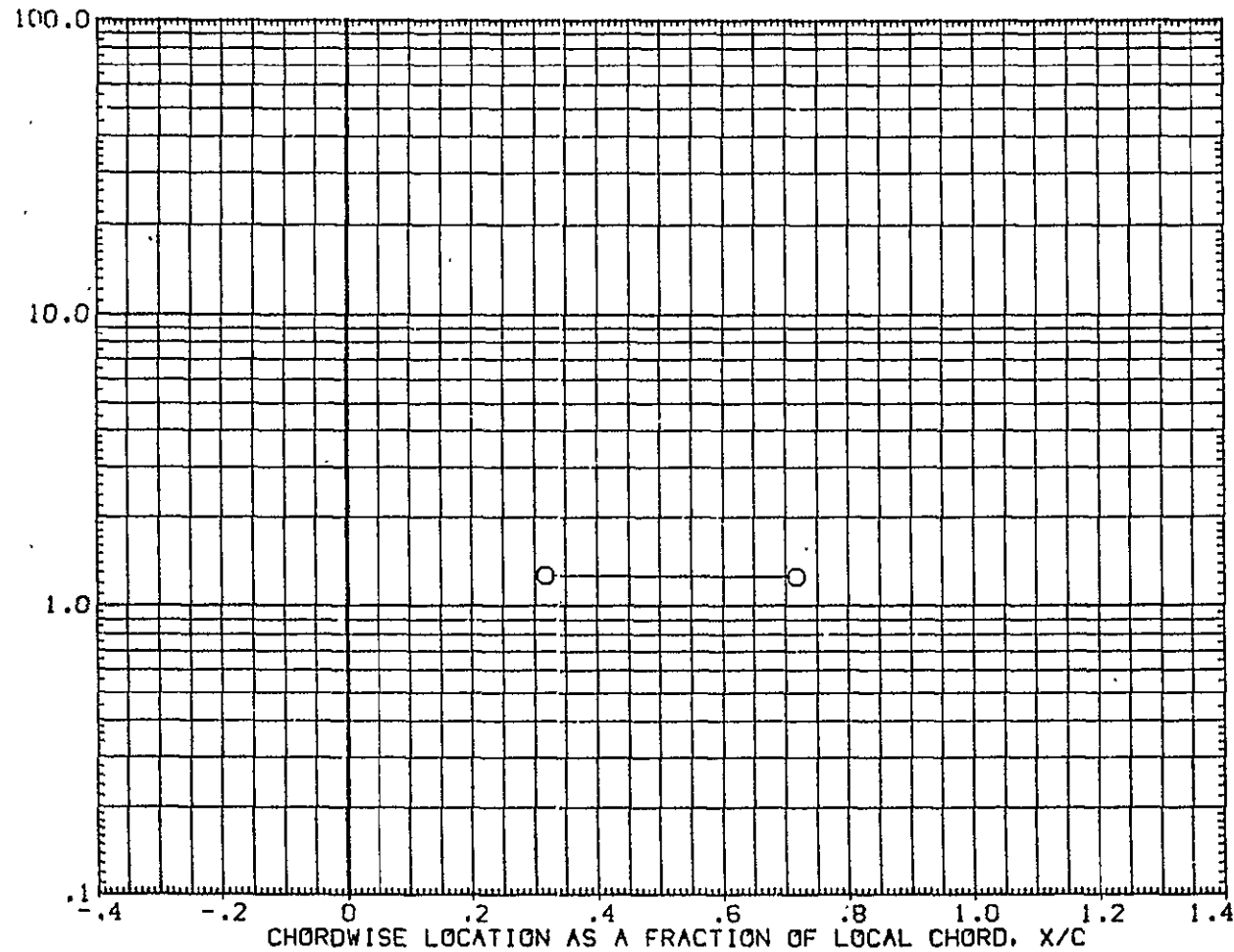


FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

OH12 + IH21 MODEL 37 OT(06)/O(08) WING L.S. (IUGW06)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
O	.900	.950	19.170	ALPHA	5.000	BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, HI/HU

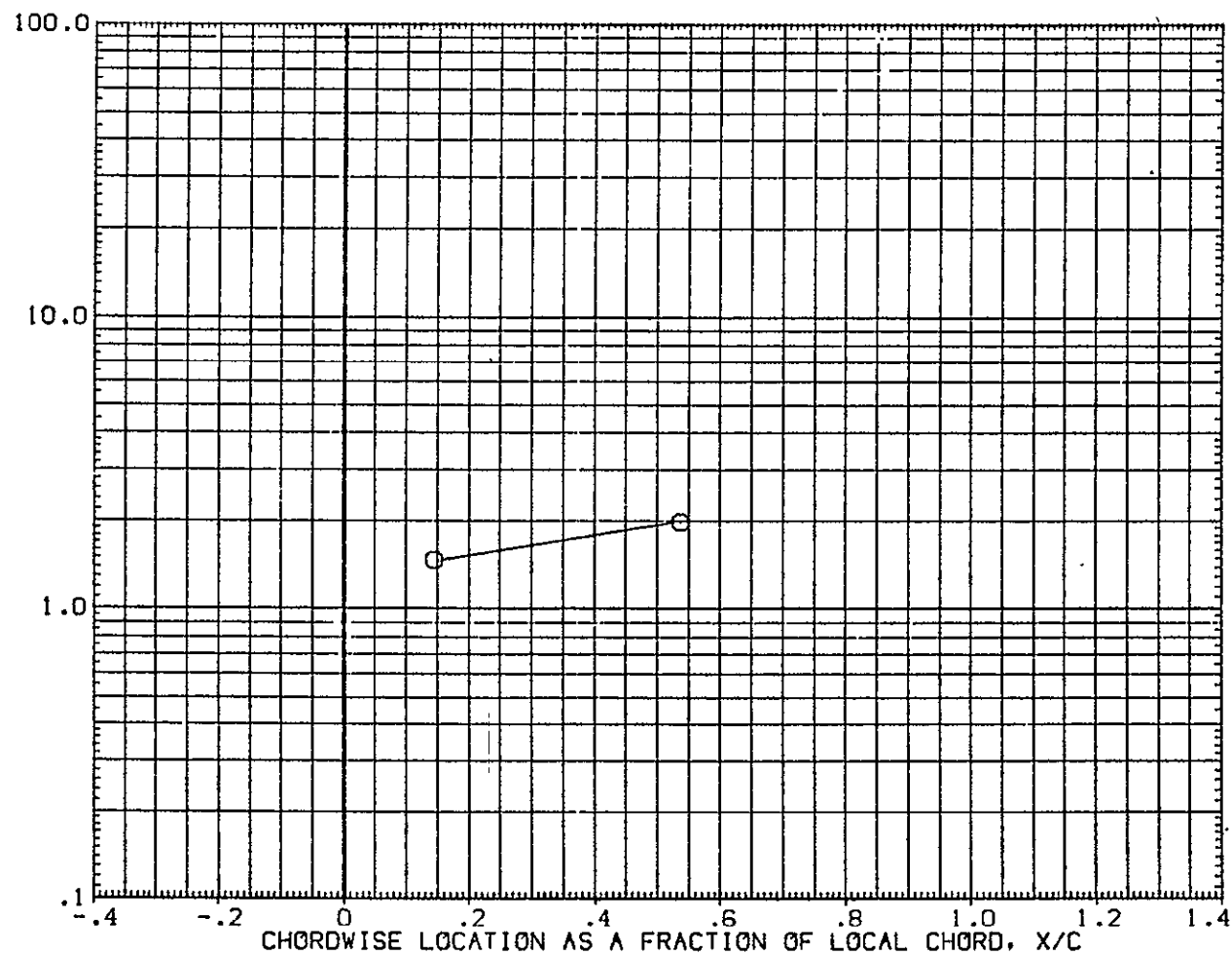


FIG. 12 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 5

CH12/IH21 (CAL HST 173-100) 37 0

VERTICAL (RUGV08)

SYMBOL	MAW/HT	GAGEND	MACH	ALPHA*	PARAMETRIC VALUES	BETA	.000
◇ □ ○	.850	40.000	19.180				
	.900						
	1.000						

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

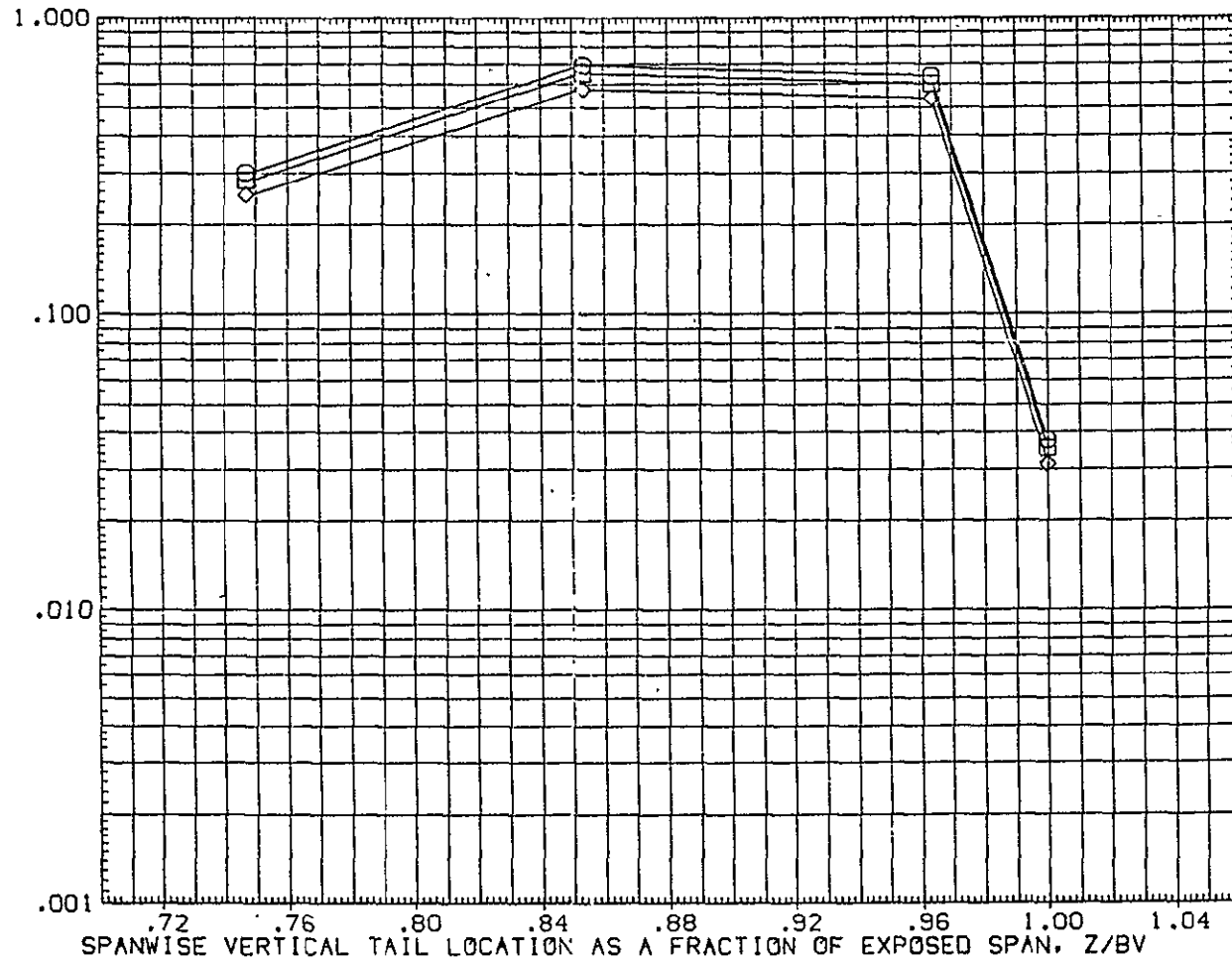


FIG. 13 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER ALPHA = 5

0H12/1H21 (CAL HST 173-100) 37 0 T VERTICAL (RUGV06)

SYMBOL	HAW/HT	GAGENO	MACH	ALPHA	PARAMETRIC VALUES	
○	.850	40.000	19.220	5.000	BETA	.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/HREF

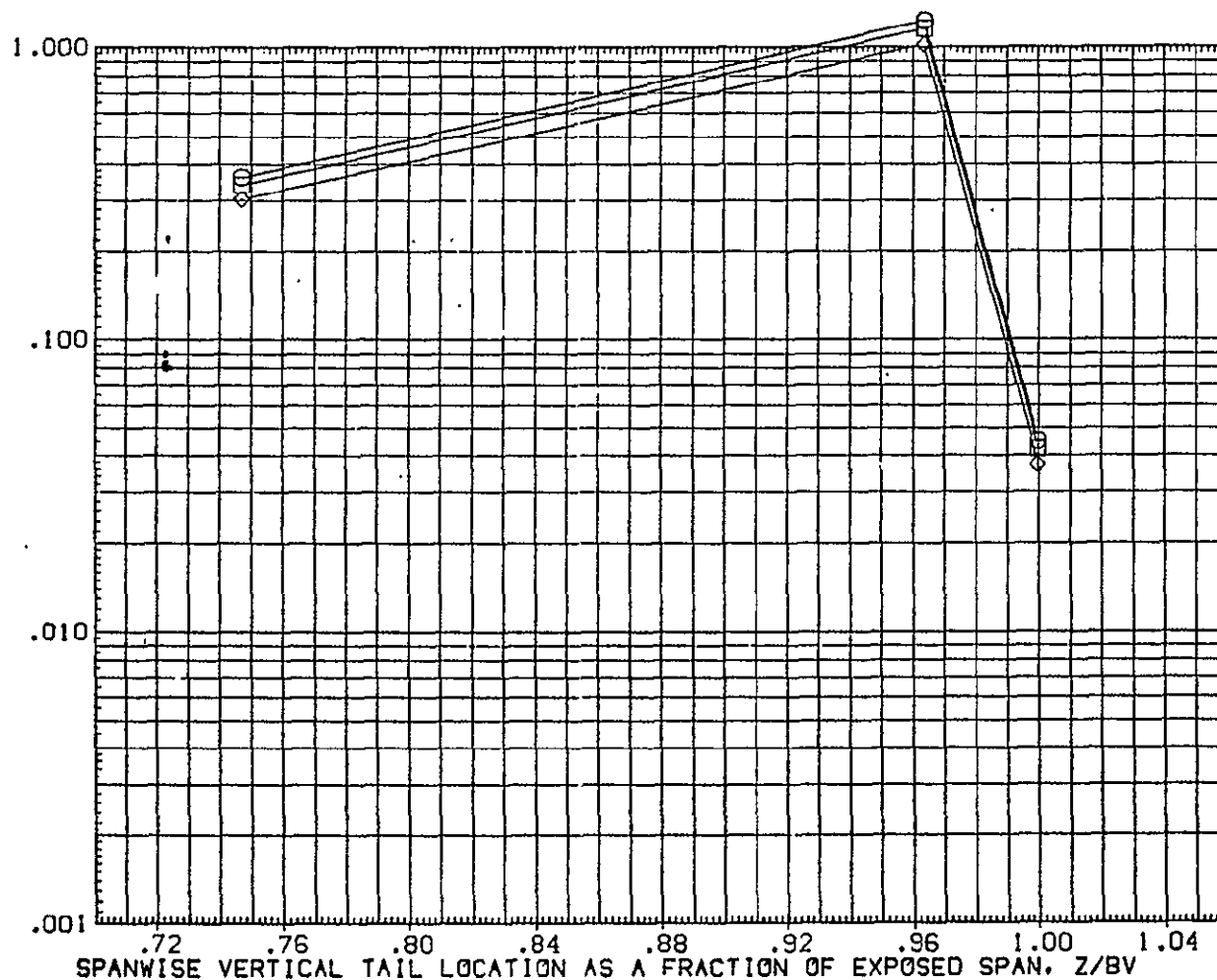


FIG. 13 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER ALPHA = 5

OH12 + IH21 MODEL 37 OT(06)/O(08) VERTICAL (IUGV06)

SYMBOL	HAW/HT	GAGENO	MACH	PARAMETRIC VALUES
O	.900	40.000	19.170	ALPHA 5.000 BETA .000

RATIO OF INTERFERENCE TO UNDISTURBED HEAT TRANSFER COEFFICIENT, H_i/H_u

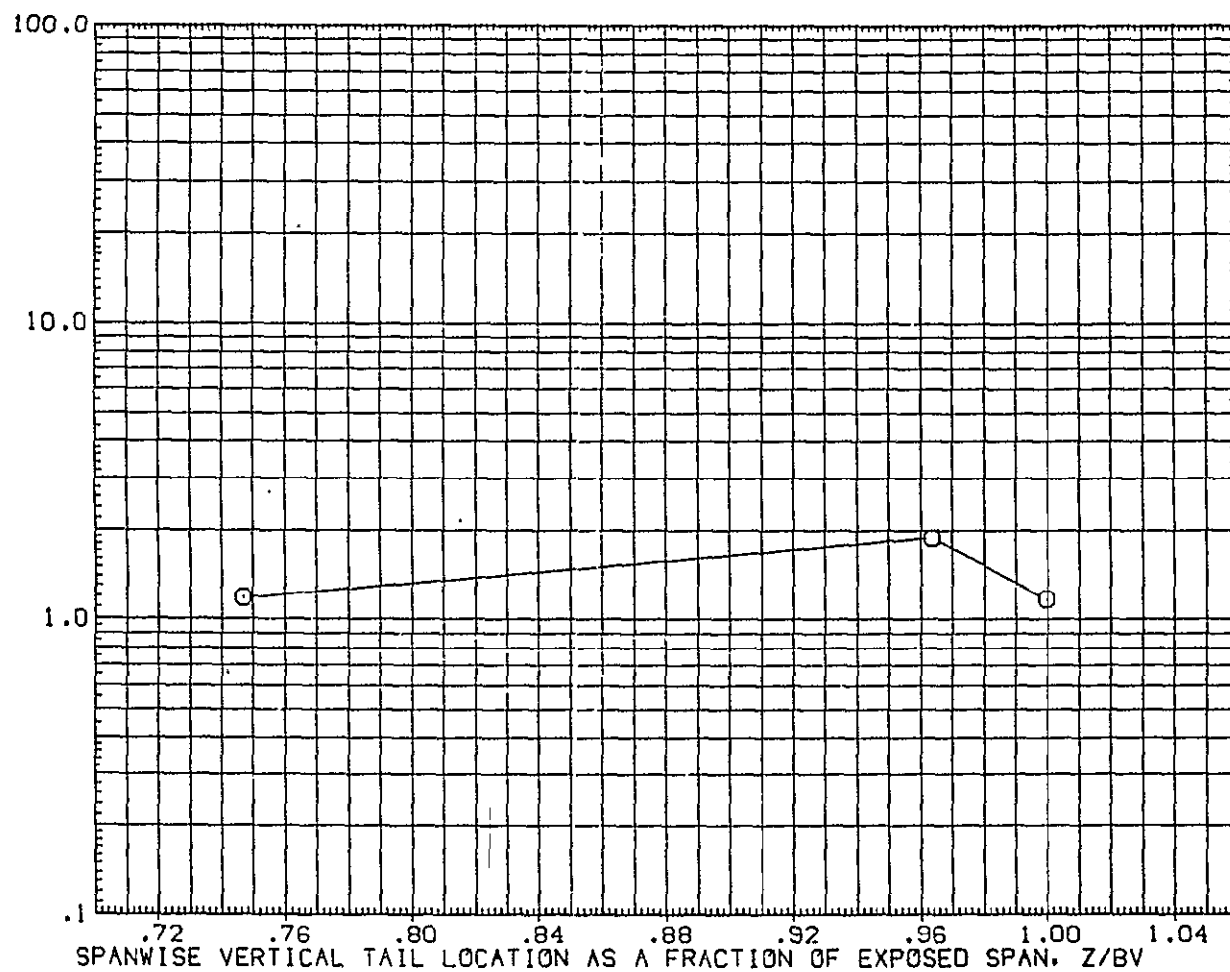


FIG. 13 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER ALPHA = 5

0H12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT14)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	
○	.650	.000	15.700		.000	BETA
□	.900					.000
◇	1.000					

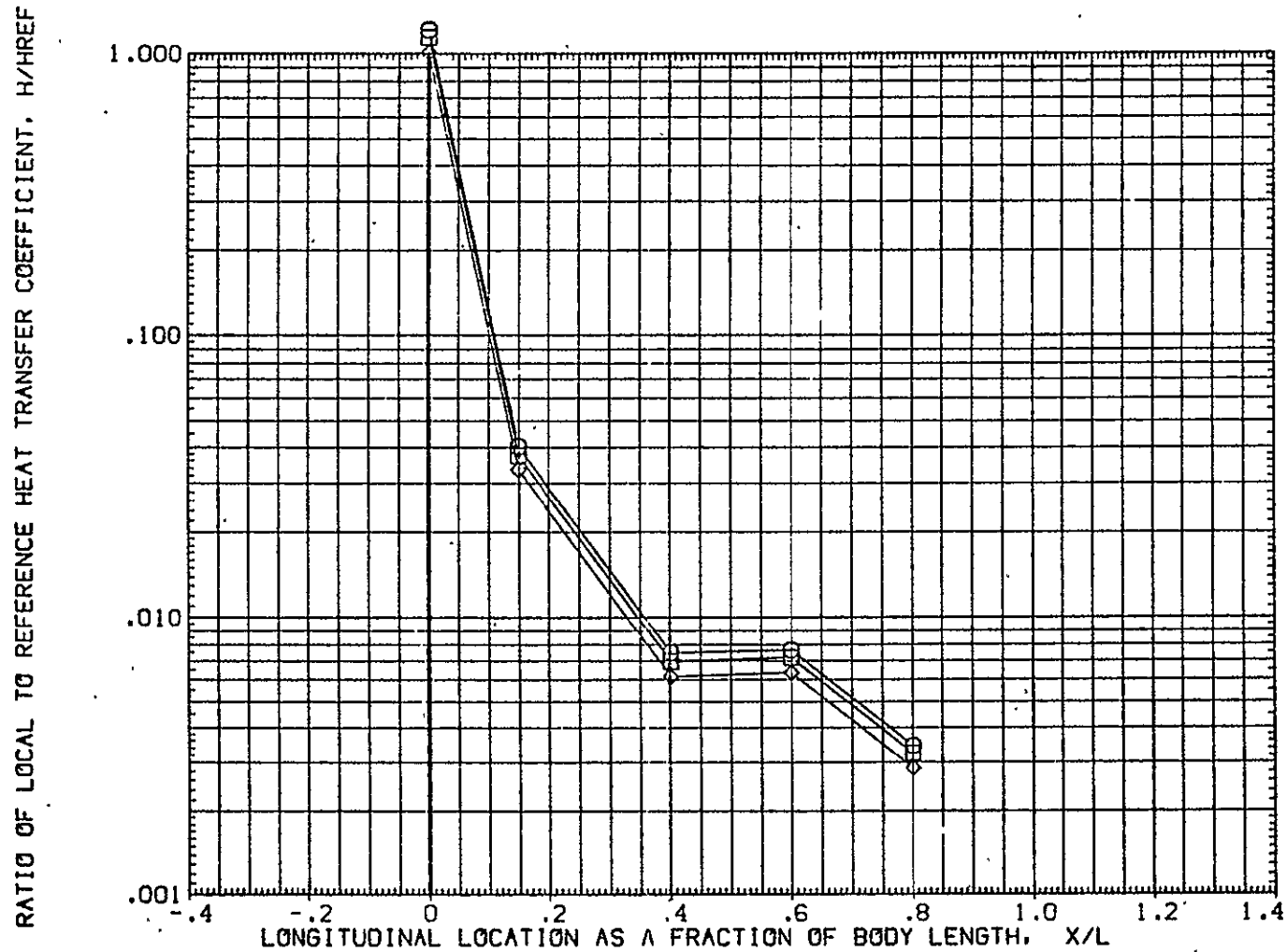


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L2$ ALPHA = 0

OH12/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT14)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	180.000	15.700	.050	.000	
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

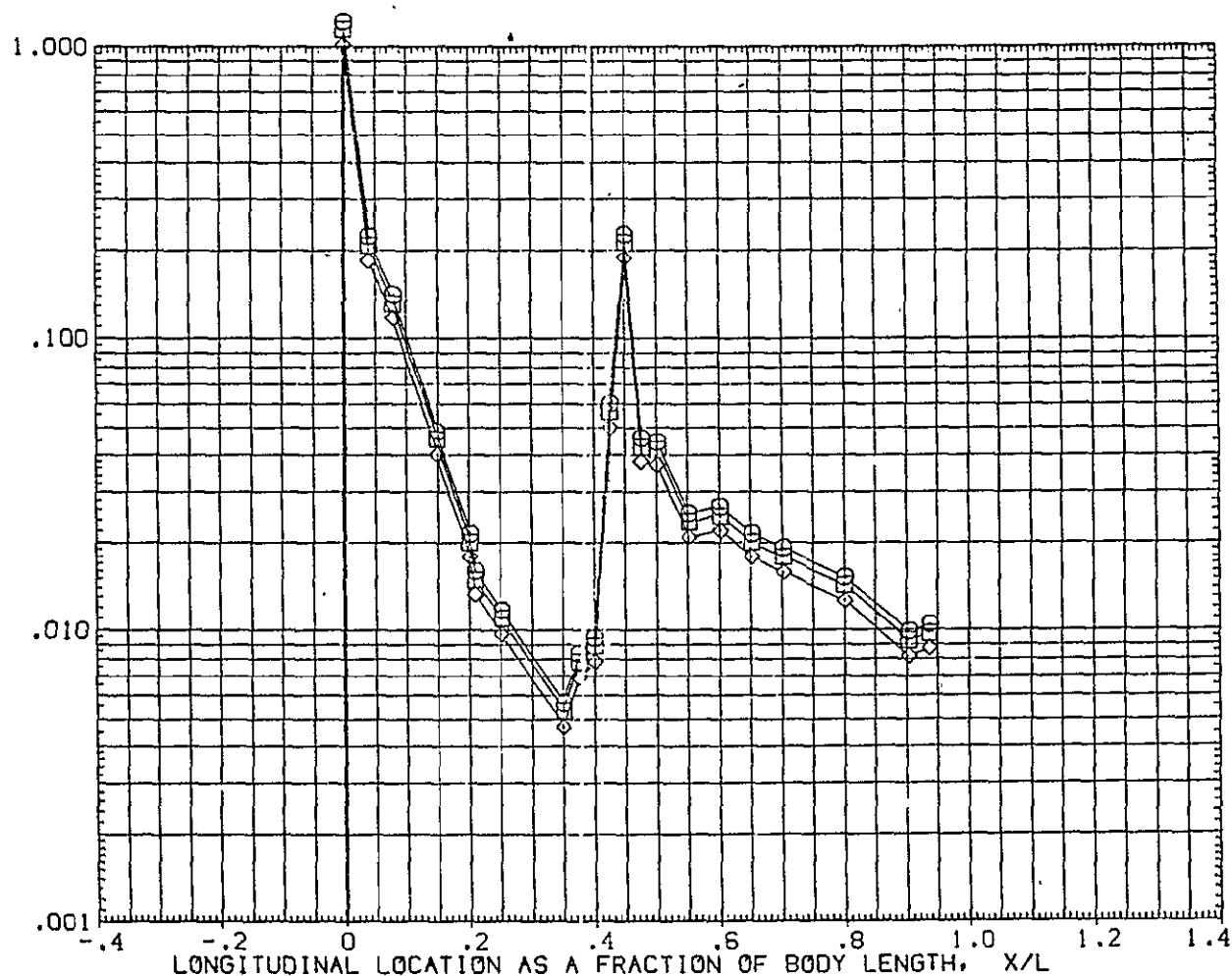


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L2$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT14)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	199.000	15.700	ALPHA	.000	BETA
□	.900					.000
◇	1.000					

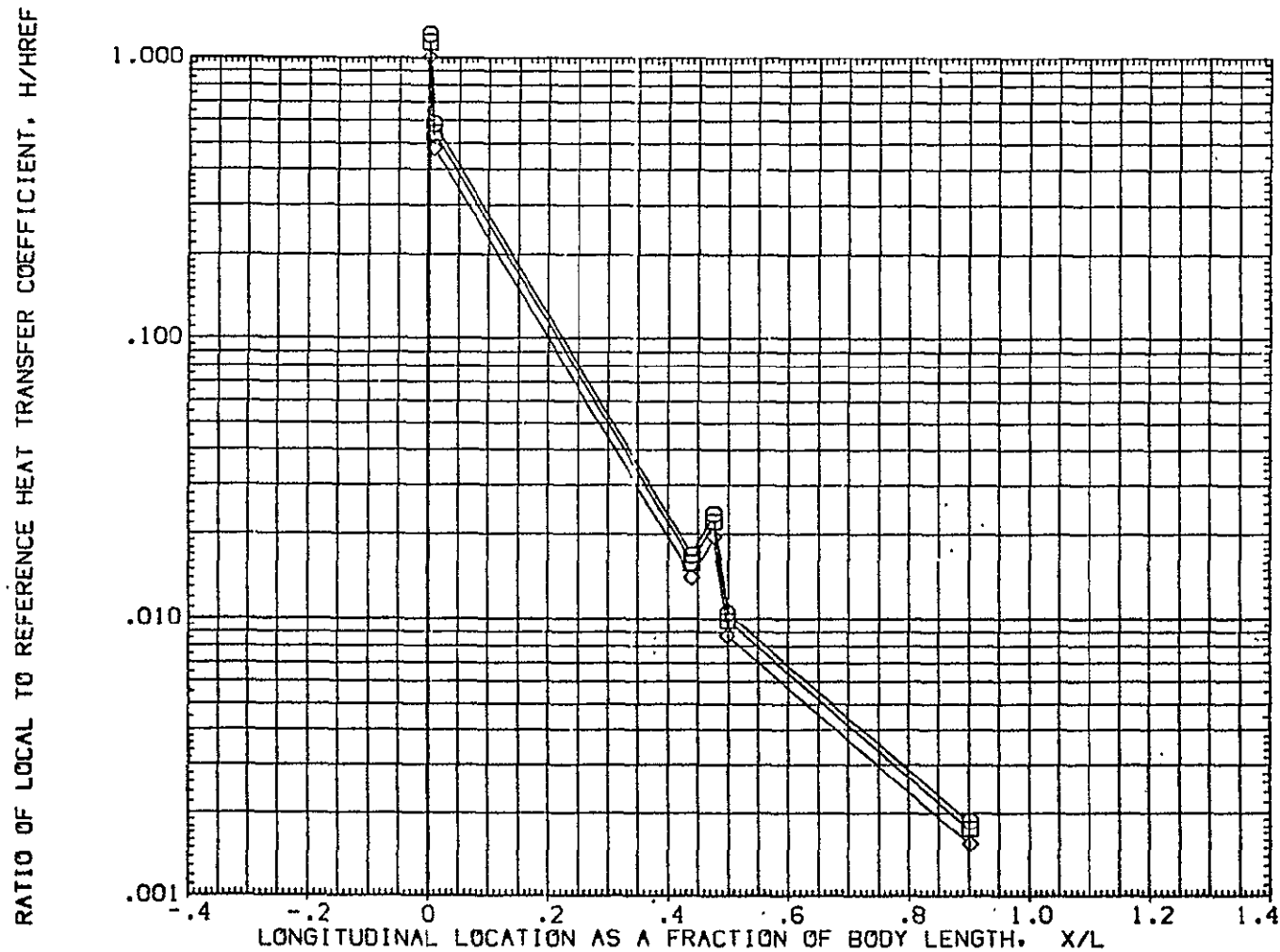


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/L^2 ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT14)

SYMBOL	HAY/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	221.000	15.700	.000		.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

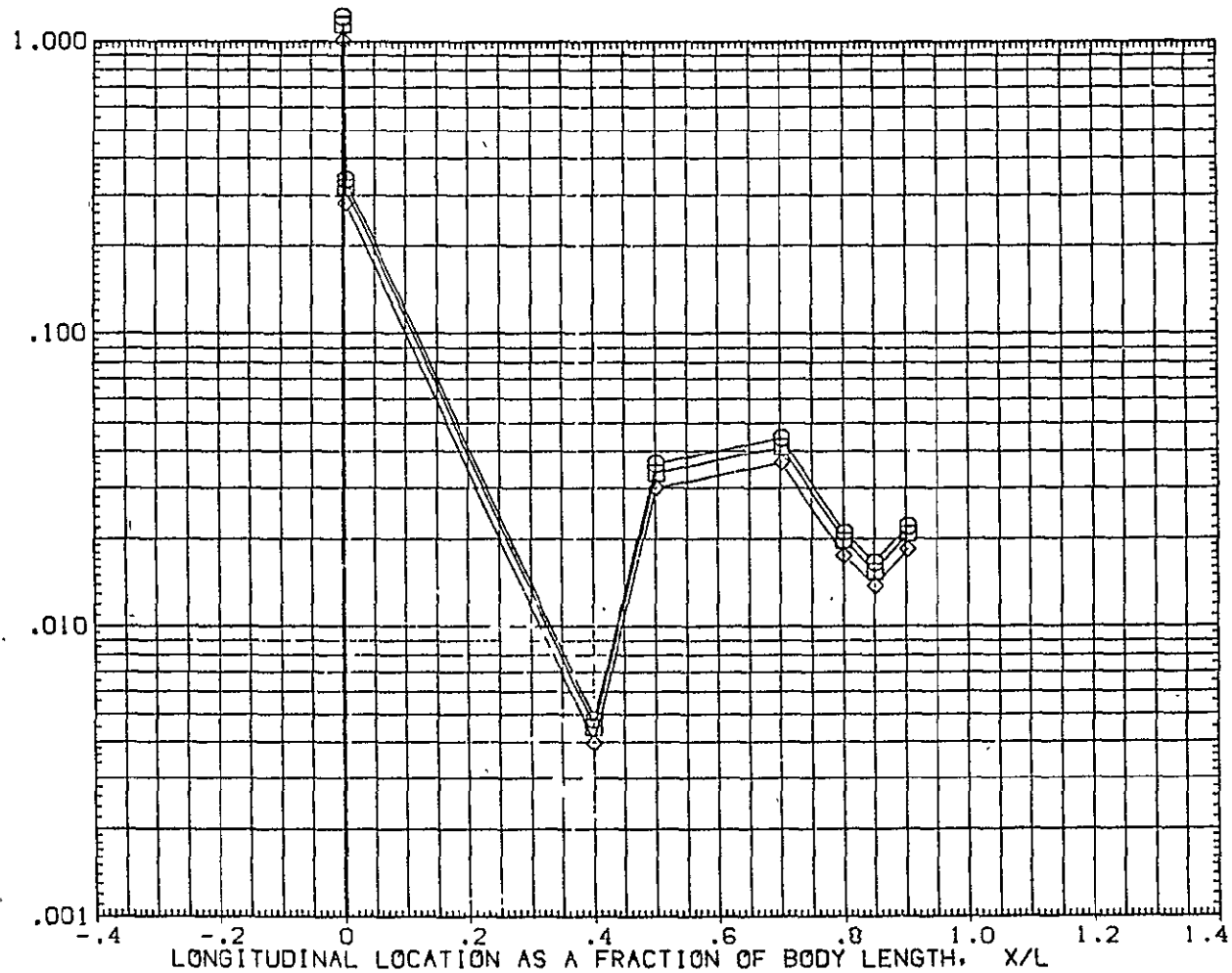


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L2$ ALPHA = 0

GH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT14)

SYMBOL	RAV/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	241.000	15.700	ALPHA	.000	BETA
□	.900					.000
◇	1.000					

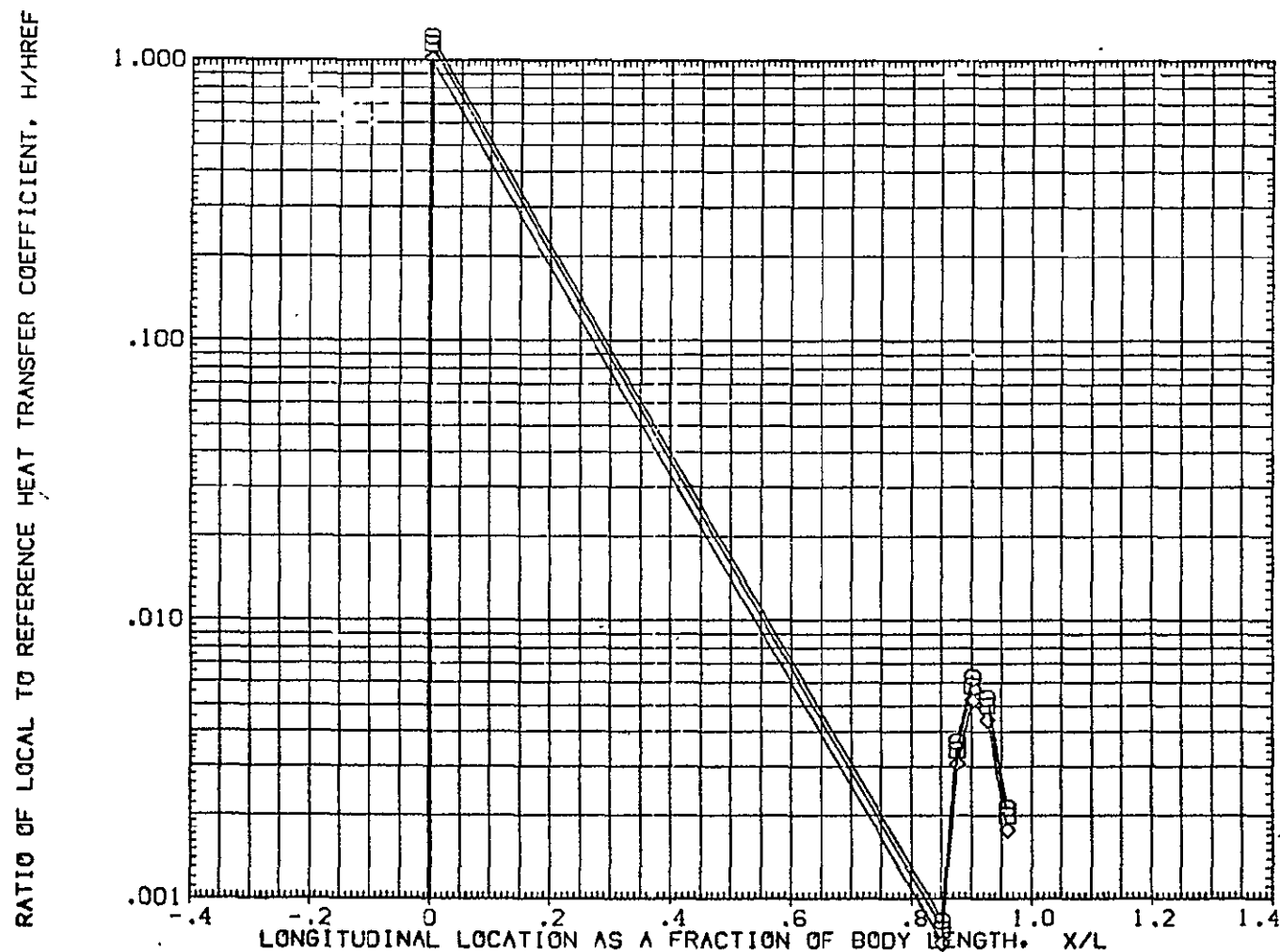


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L2$ ALPHA = 0

0412/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT14)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES
◇	.850	247.000	15.700	ALPHA .000 BETA .000
□	.900			
○	1.000			

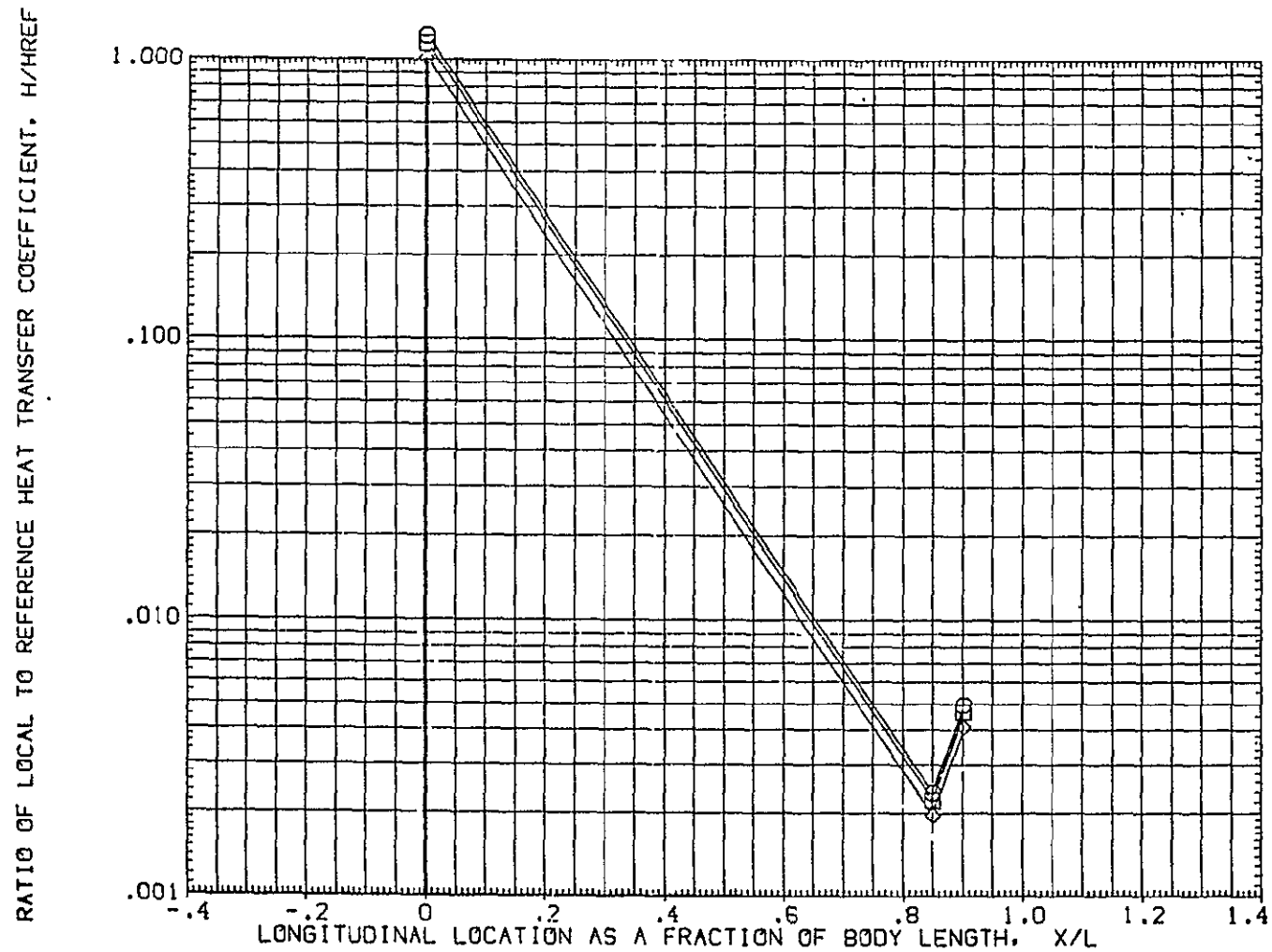


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L2$ ALPHA = 0

0H12/1421 (CAL HST 173-100) 37 0 T TANK (RUGT14)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	270.000	15.700	.000	.000	.000
□	.900					
○	1.000					

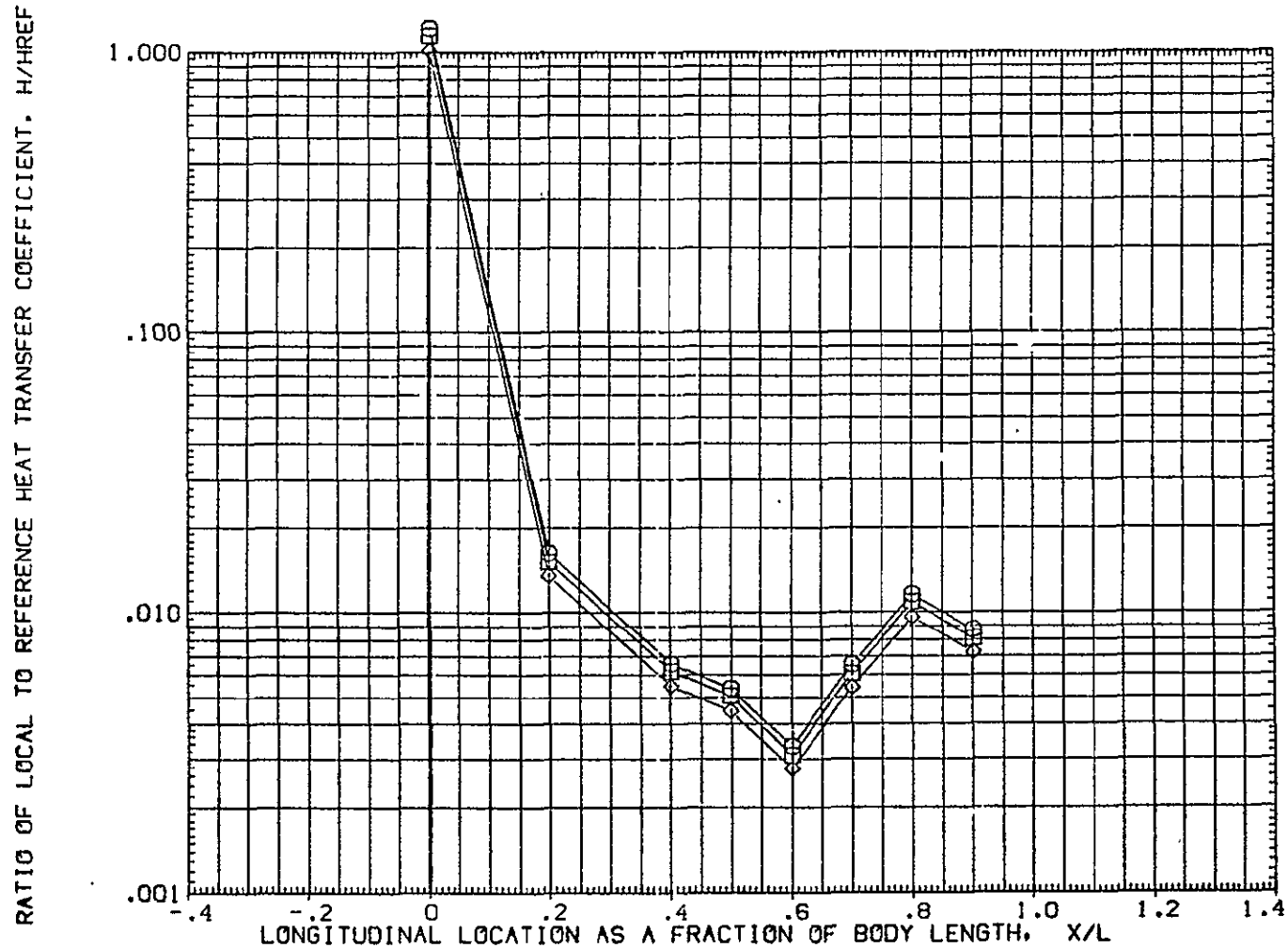


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L2$ ALPHA = 0

OH12/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT14)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES	BETA	
○	.850	315.000	15.700		.000		.000
□	.900						
◇	1.000						

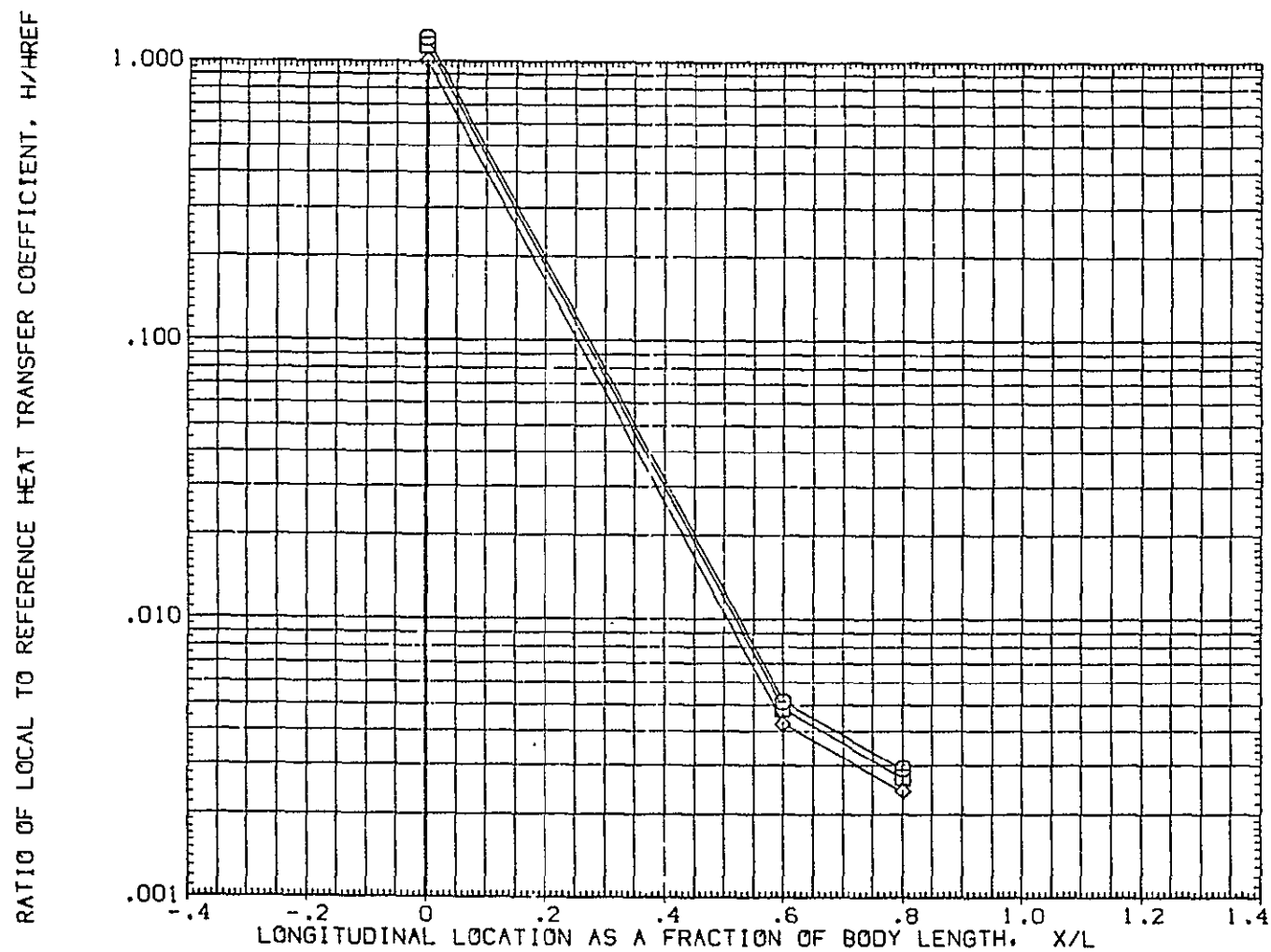


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L2$ $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT14)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	.000	16.000	.000	.000	.000
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

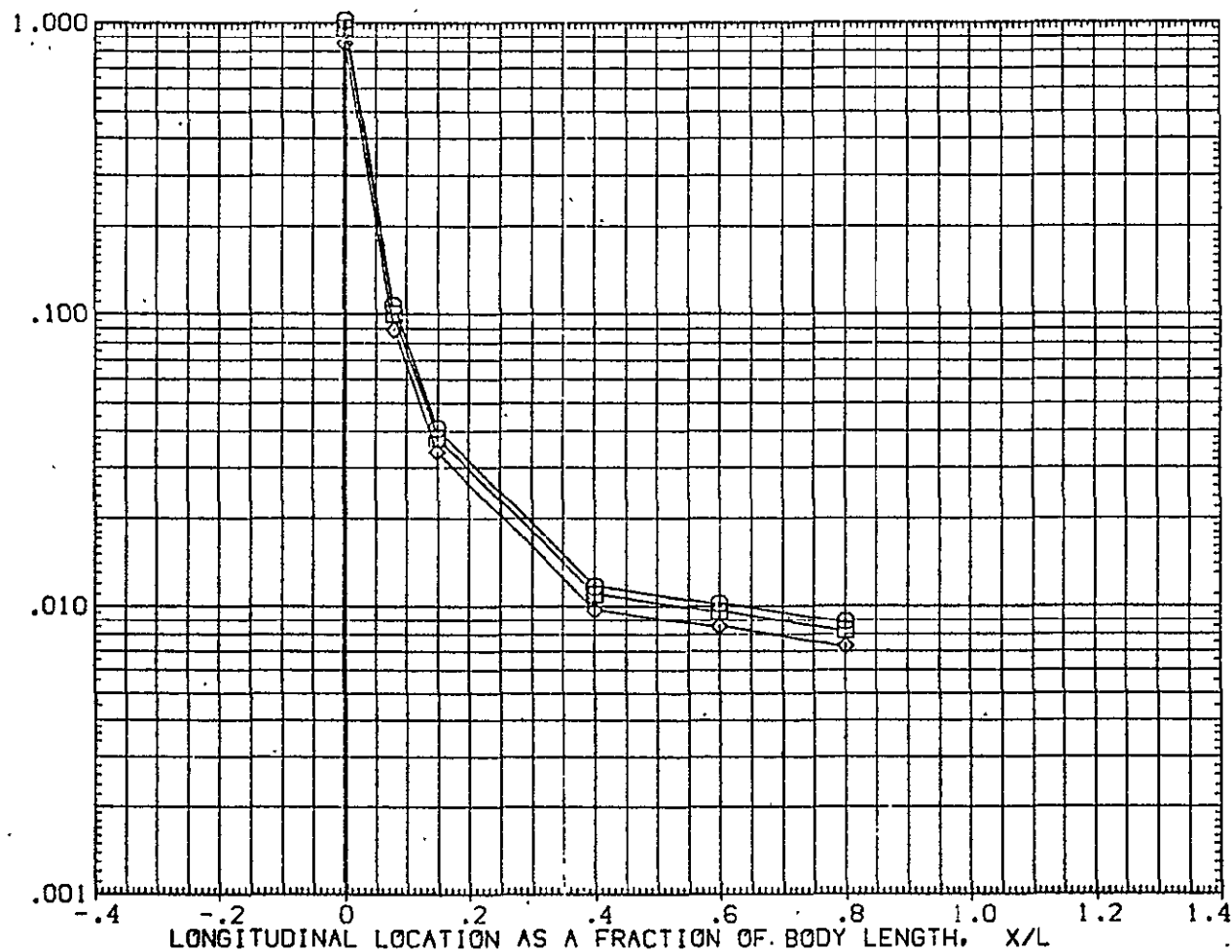


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/L^2 ALPHA = 0

0412/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT14)

SYMBOL	RAV/HT	PHI	MACH	PARAMETRIC VALUES		
○	.850	180.000	16.000	ALPHA	.000	BETA
□	.900					.000
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

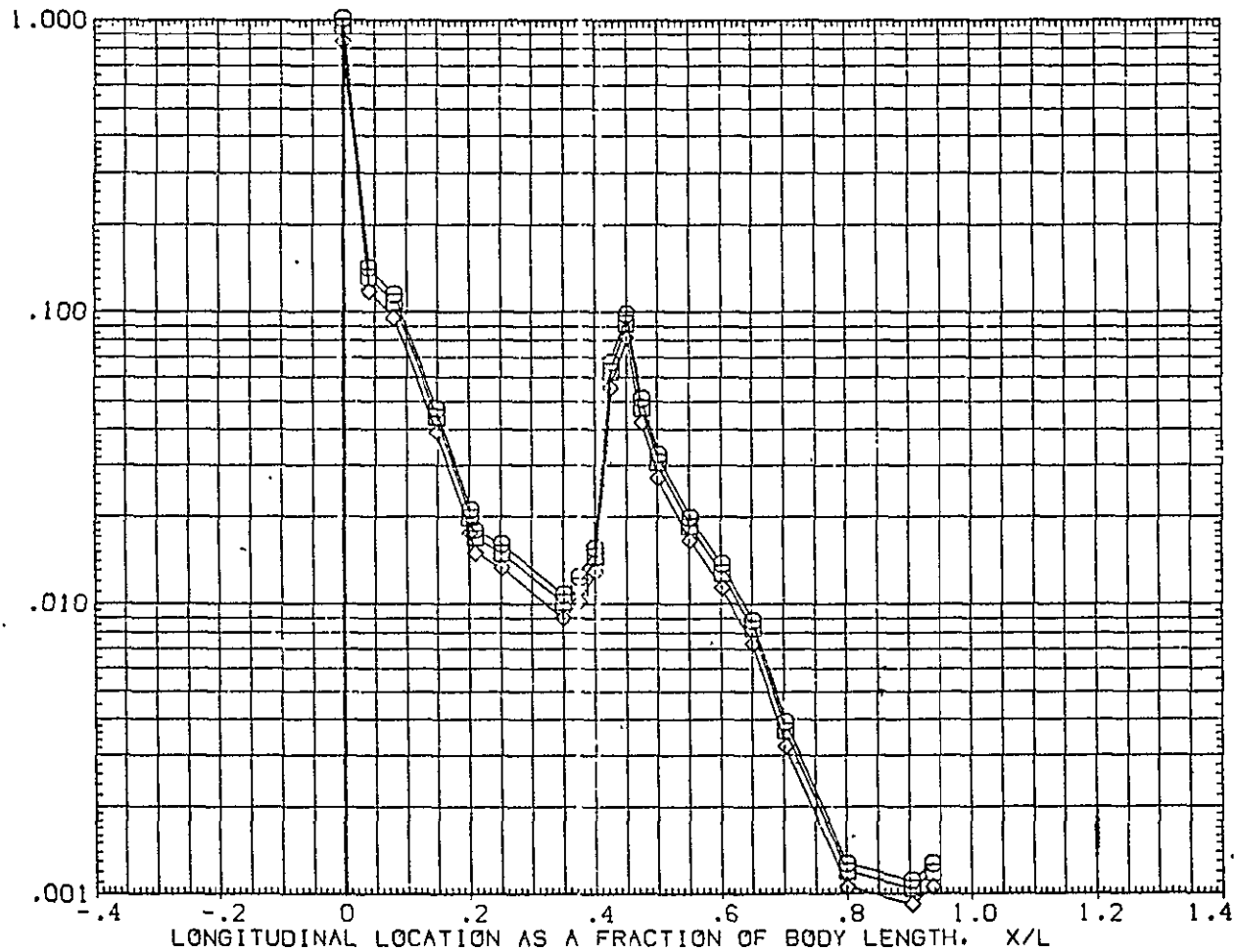


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L2$ ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT14)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	199.000	16.000	.000	.000	.000
◇	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

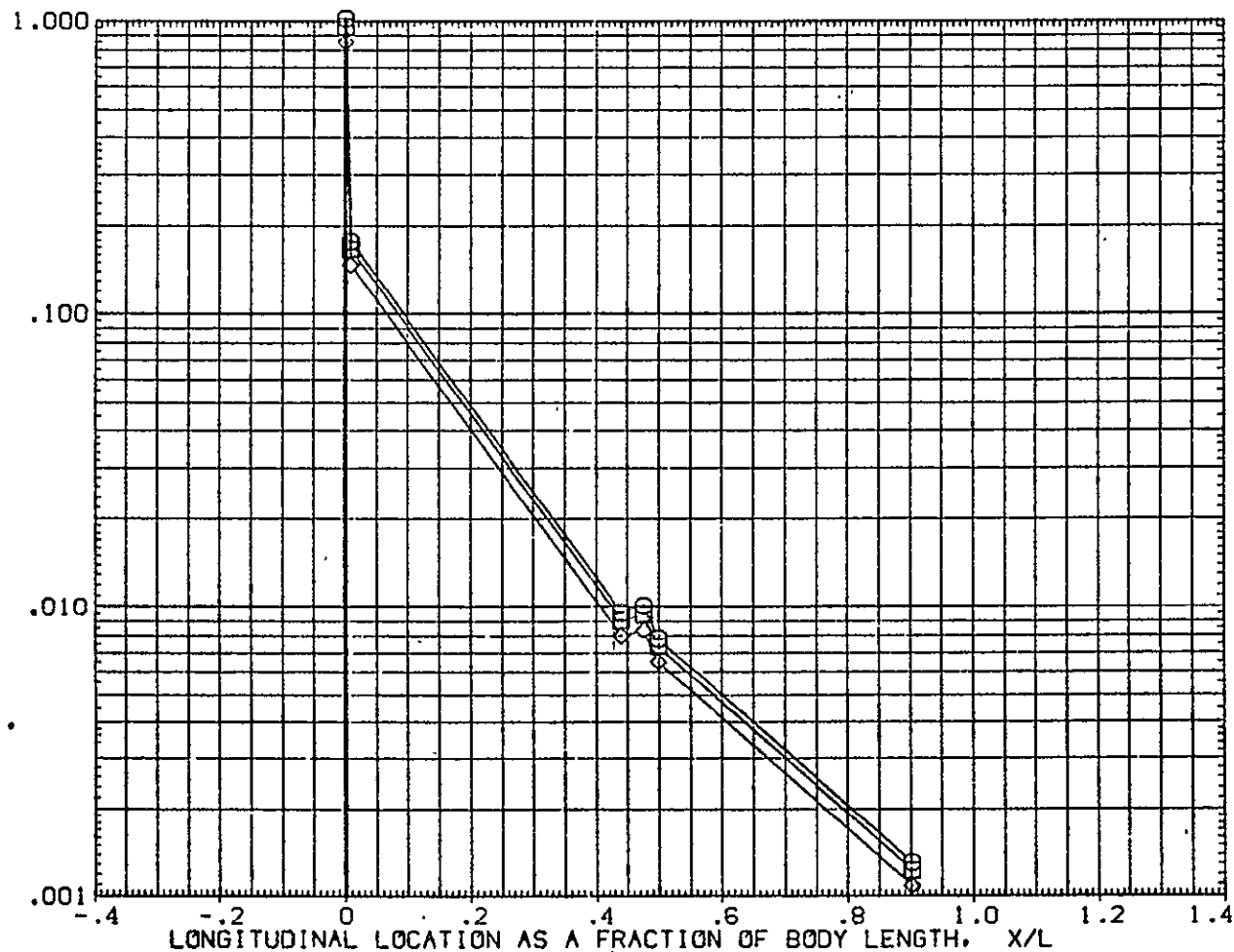


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L2$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT14)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	221.000	16.000	.000		.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

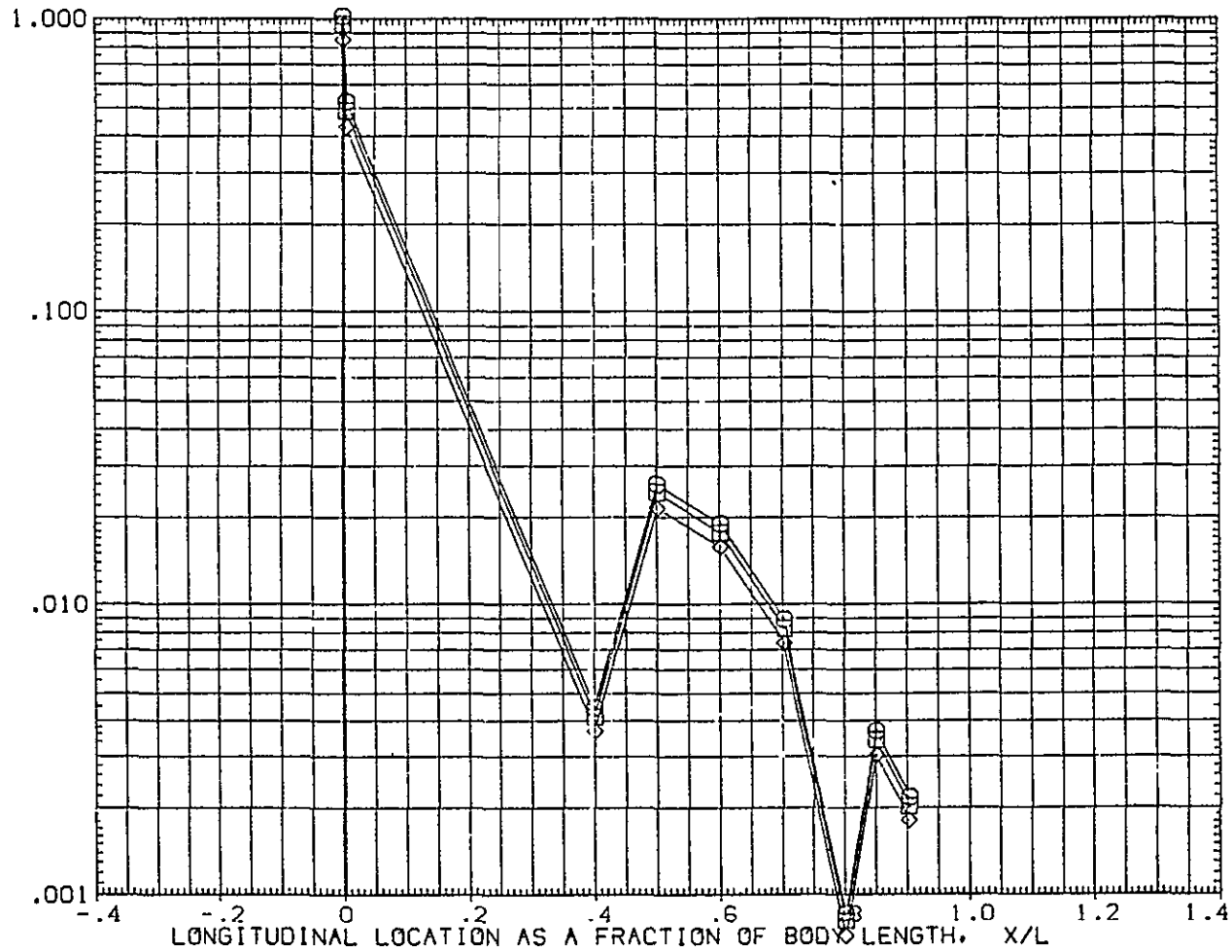


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L2$ $\alpha = 0$

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT14)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	241.000	16.000	.000	.000	.000
□	.900					
○	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

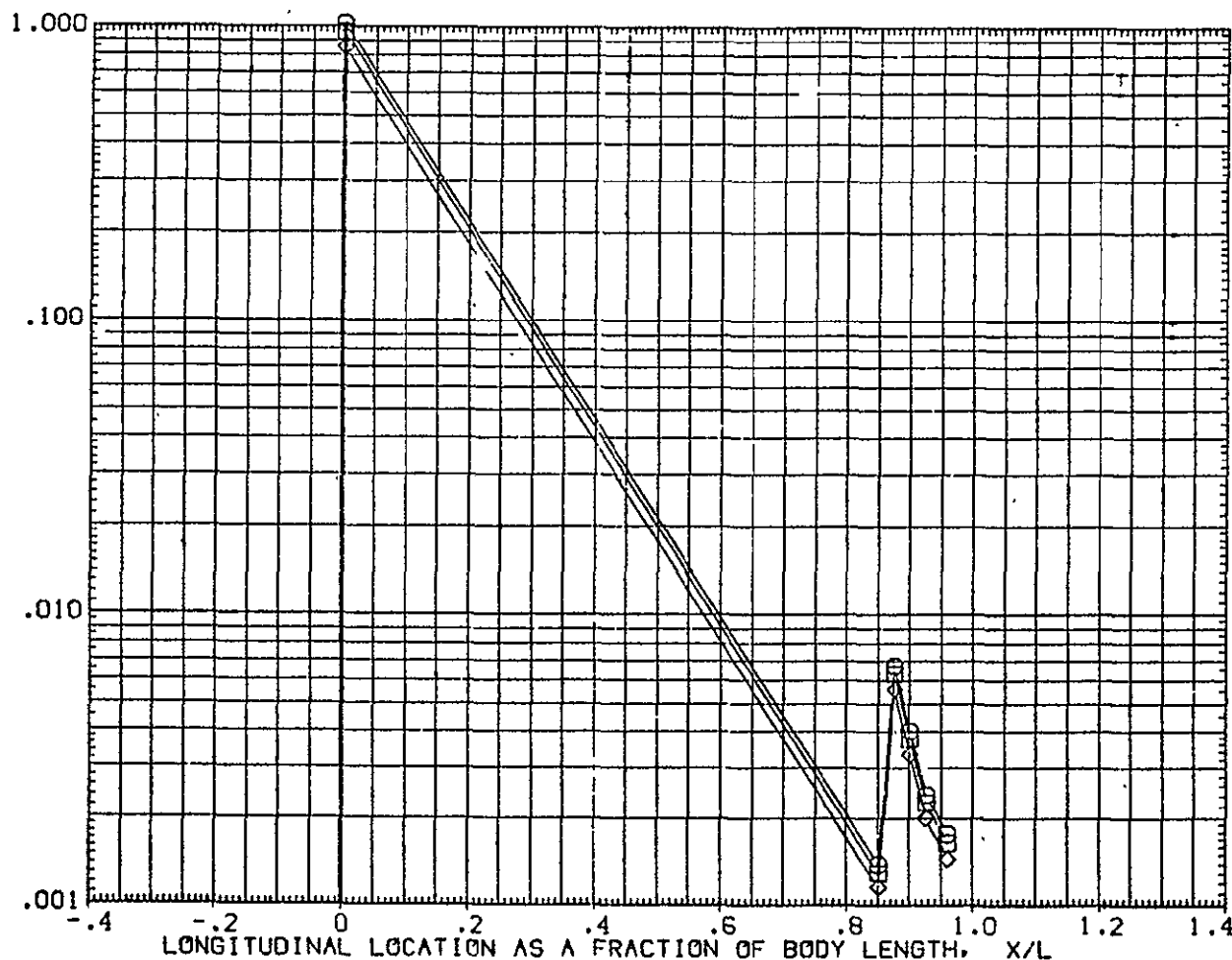


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L2$ ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0 T TANK (RUGT14)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
□	.850	247.000	16.000	ALPHA	.000	BETA
◇	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

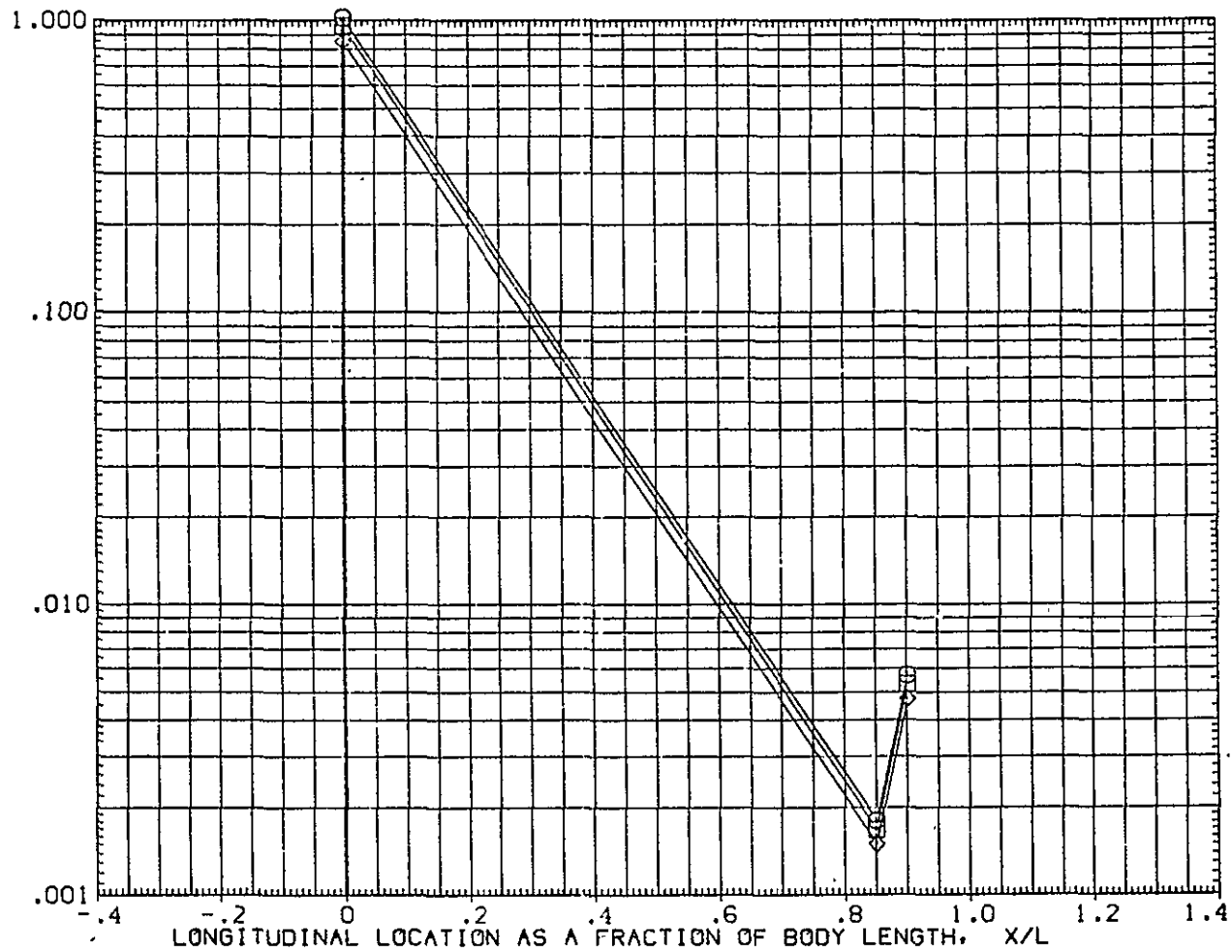


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L2$ ALPHA = 0

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ORIGINAL PAGE IS POOR

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

OH12/IH21 (CAL HST 173-100) 37 Q T TANK (RUGT14)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES
○	.850	270.000	16.000	ALPHA .000 BETA .000
□	.900			
◇	1.000			

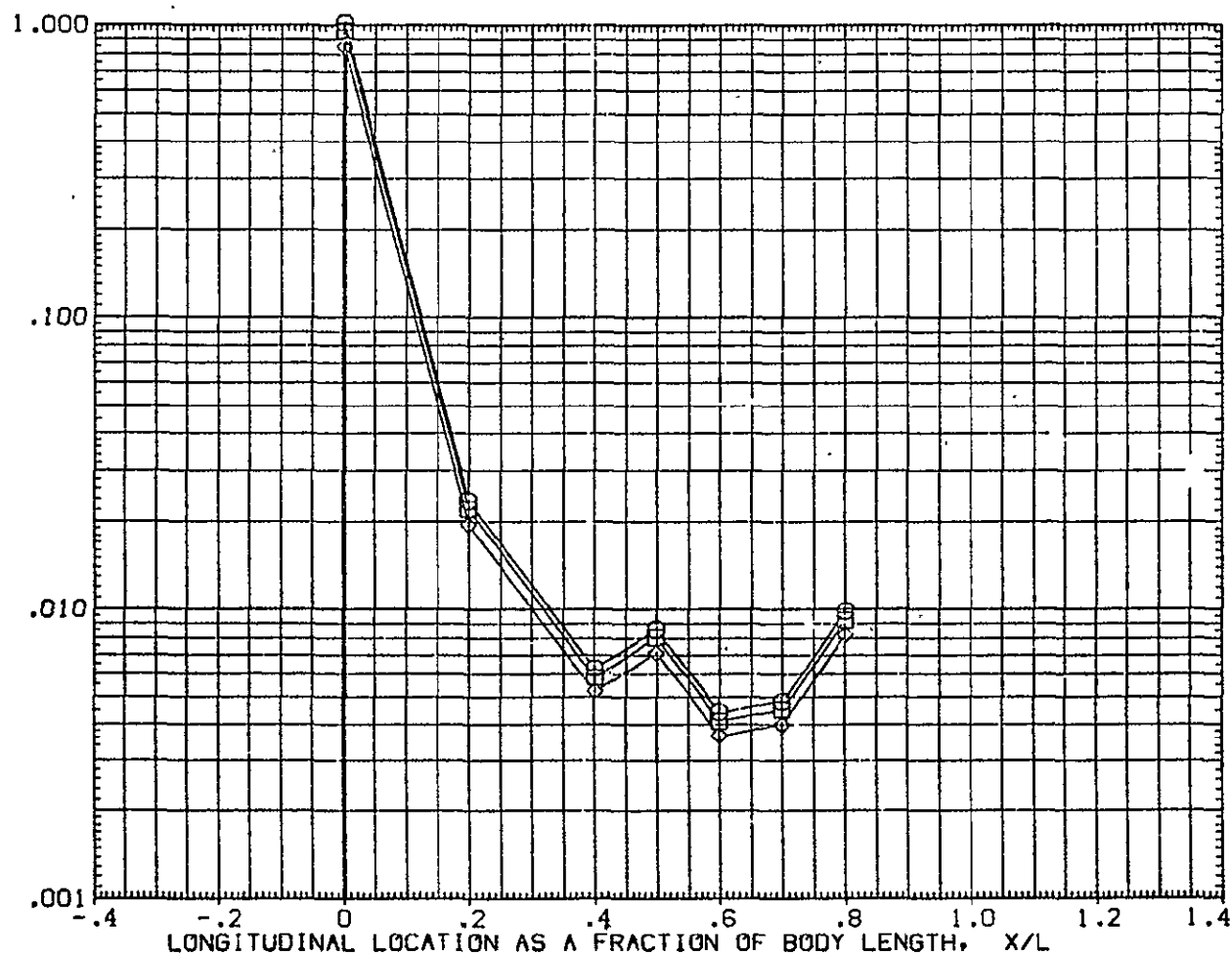


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER $RN/L2$ ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T TANK (RUGT14)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES	
				ALPHA	BETA
○	.850	315.000	16.000	.000	.000
□	.900				
◇	1.000				

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

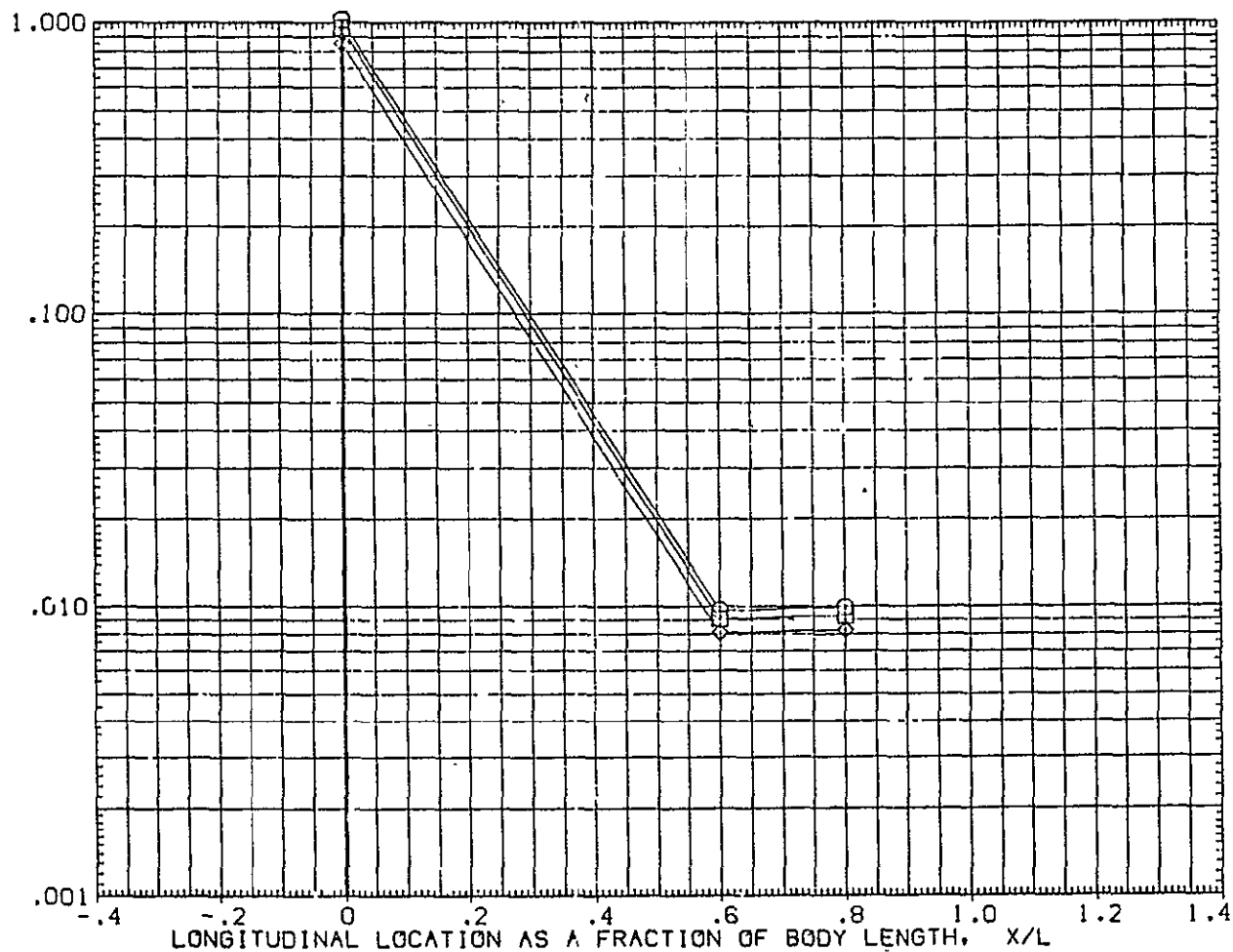


FIG. 14 EFFECT OF RECOVERY FACTOR ON THE E. TANK HEAT TRANSFER RN/L^2 ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB14)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES
○	.850	.003	16.050	ALPHA .000 BETA .000
□	.900			
◇	1.000			

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

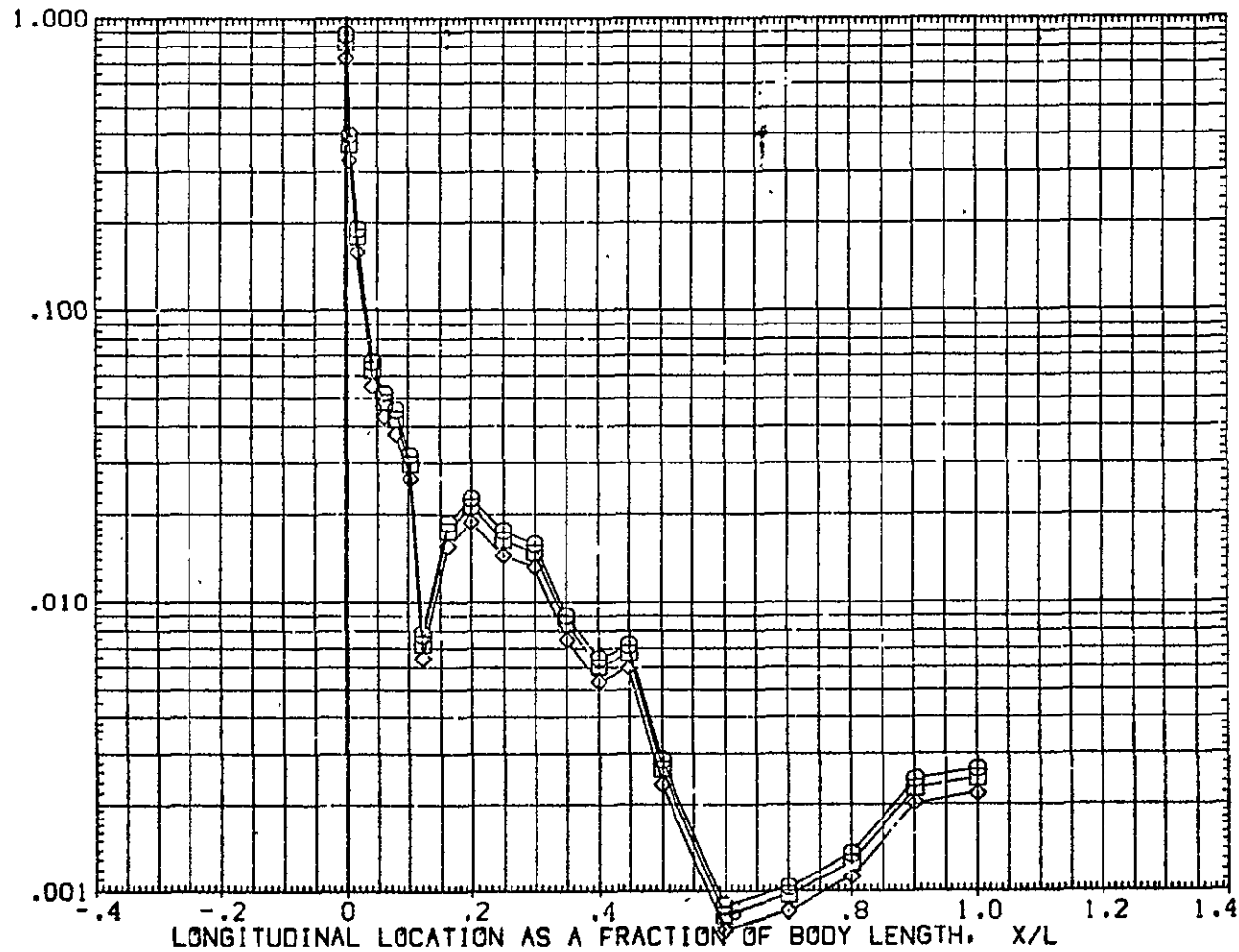


FIG. 15 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

0412/1H21 (CAL HST 173-100) 37 0 T FUSELAGE (PUGB14)

SYMBOL	H _A /H _T	PR	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
◇	.850	25.000	16.050	.000	.000	.000
□	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

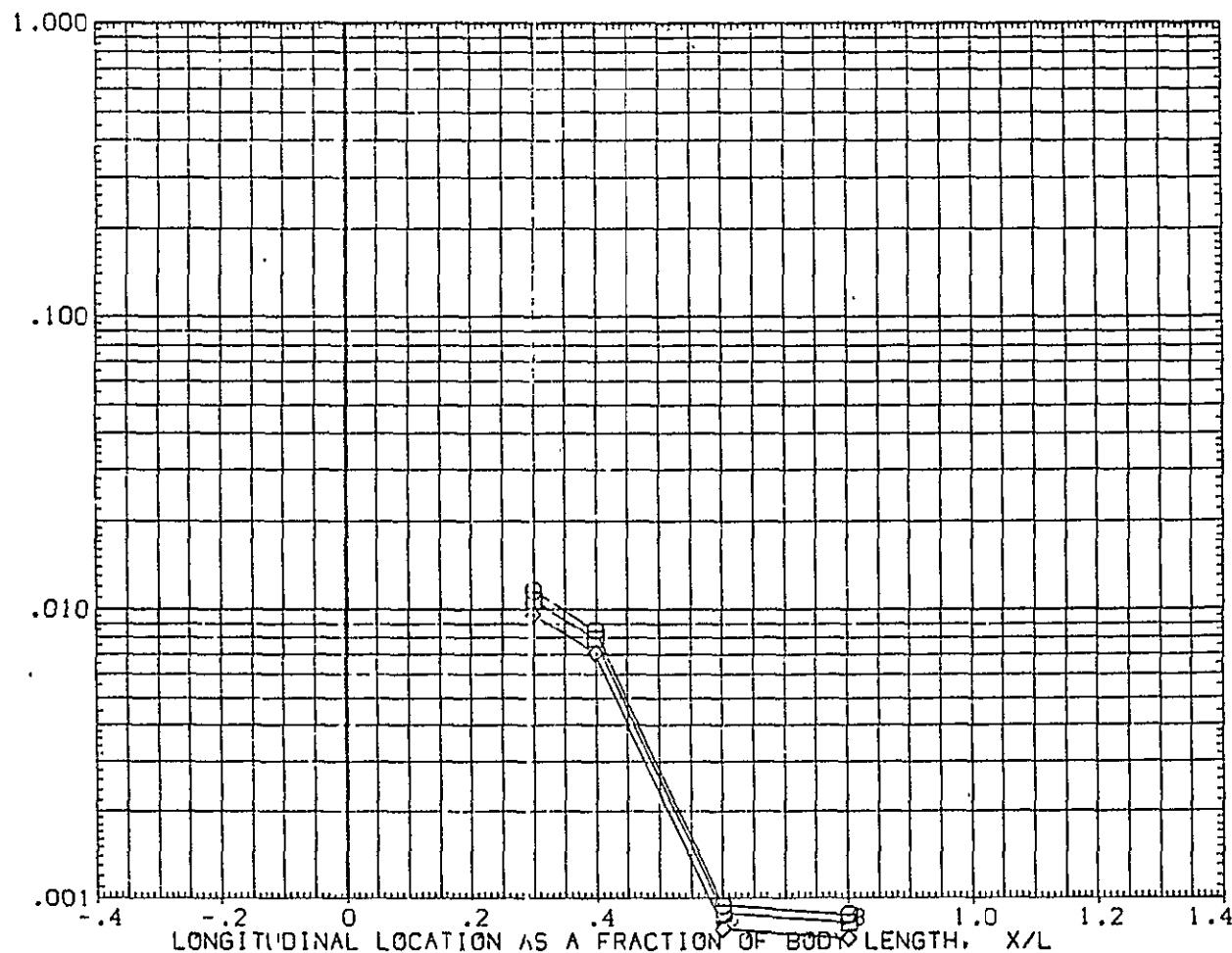


FIG. 15 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

0H12/1H21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB14)

SYMBOL	HAW/HT	PHI	MACH	ALPHA	PARAMETRIC VALUES		BETA	
○	.850	30.000	16.050		.000			.000
□	.900							
◇	1.000							

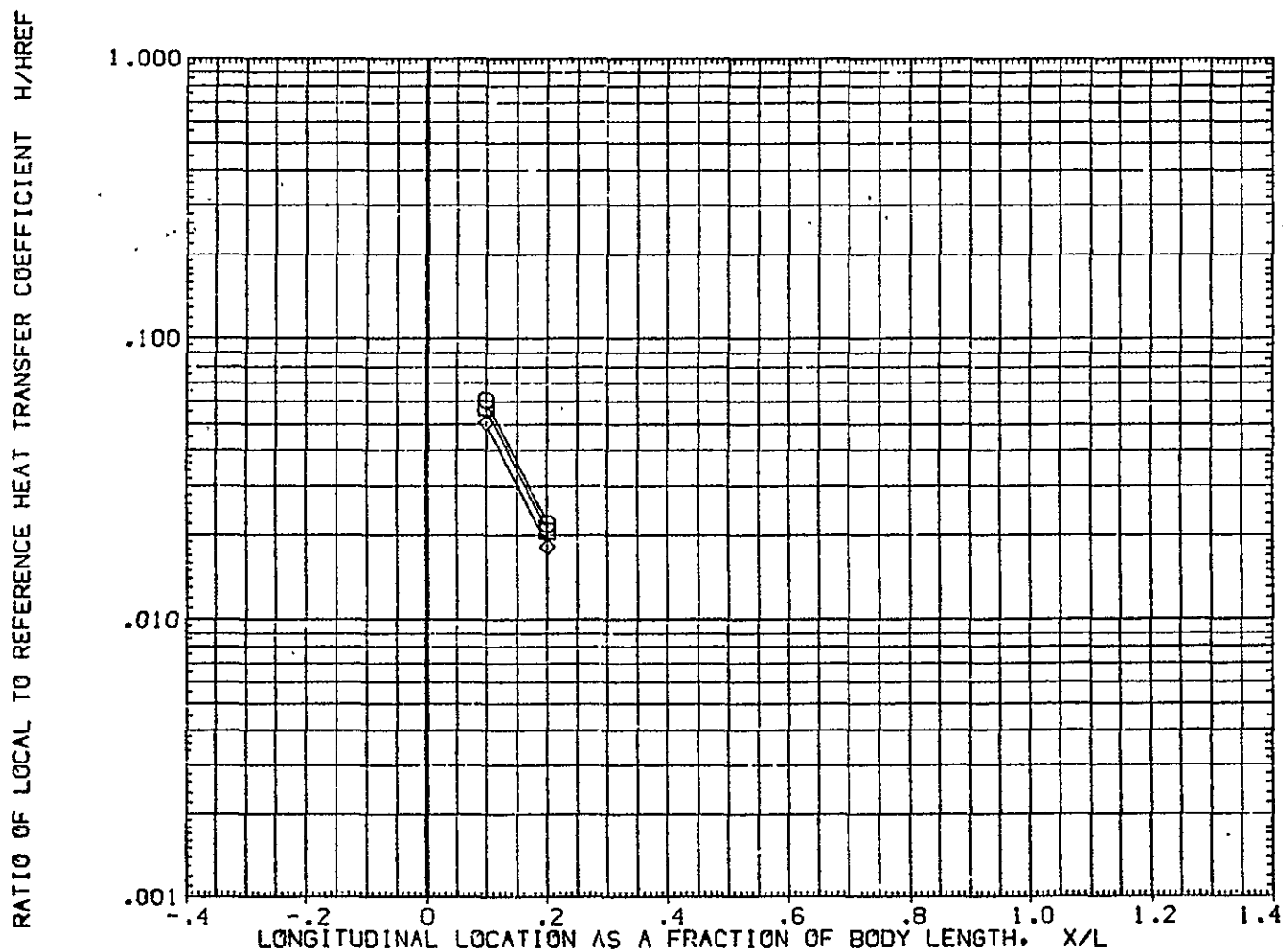


FIG. 15 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0 T FUSELAGE (RUGB14)

SYMBOL	HAW/HT	PHI	MACH	PARAMETRIC VALUES		
	.850	180.000	16.050	ALPHA	.000	BETA
	.900					.000
	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, H/H_{REF}

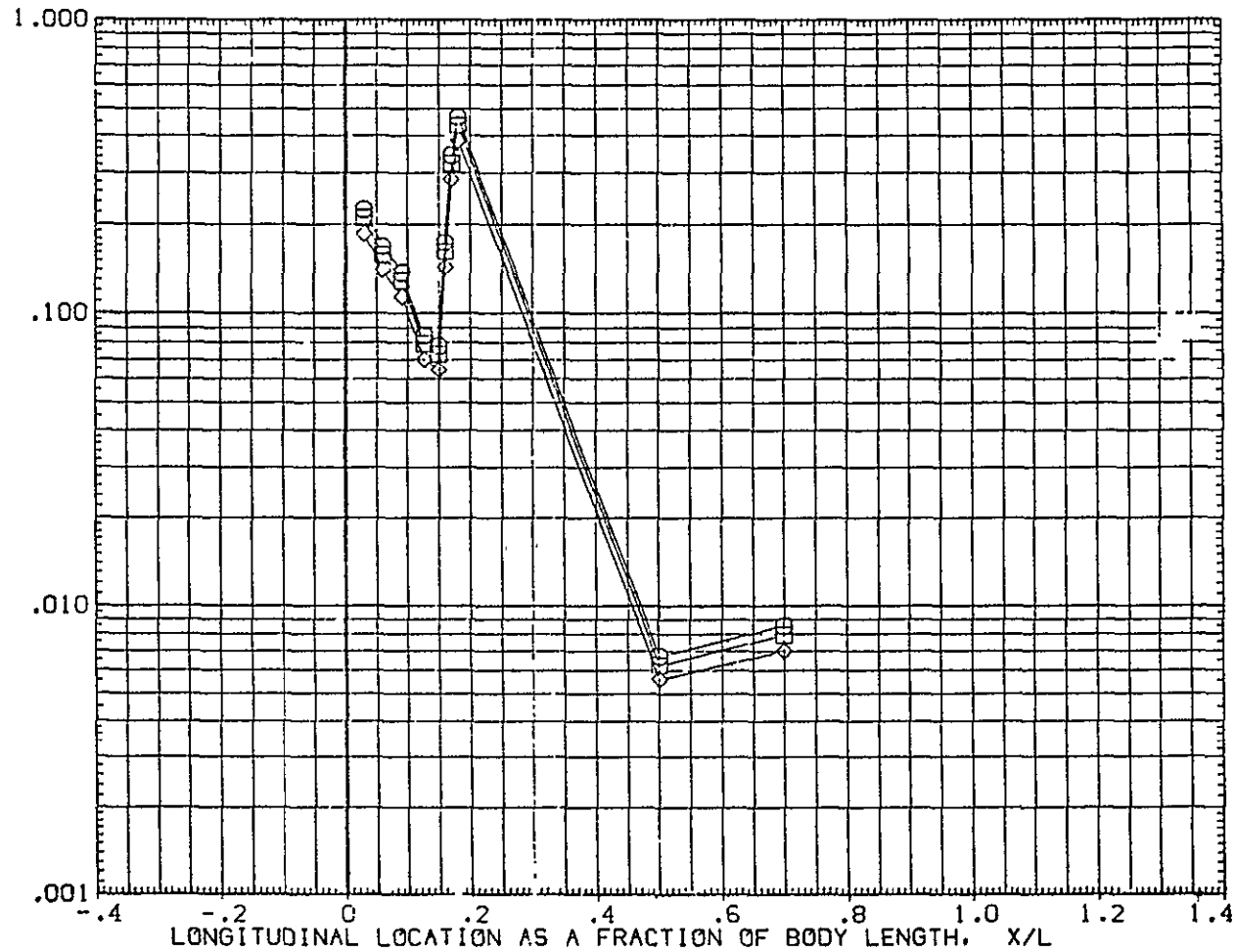


FIG. 15 EFFECT OF RECOVERY FACTOR ON THE ORBITER BODY HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST-173-100) 37 0 T WING L.S.(RUGW14)

SYMBOL	HAW/HT	ZY/B	MACH	ALPHA	PARAMETRIC VALUES		BETA	
○	.850	.250	15.050		.000			.000
□	.900							
◇	1.000							

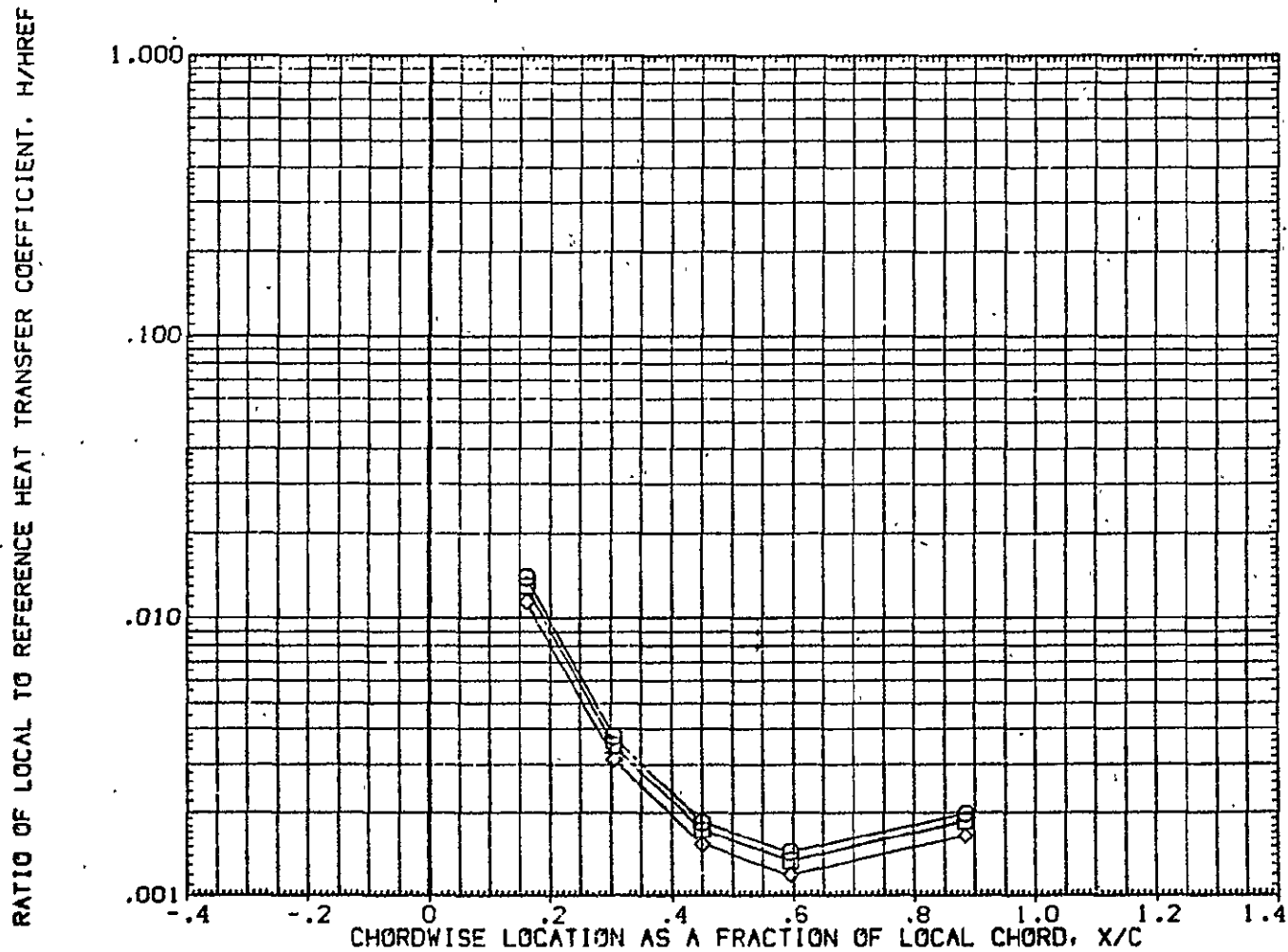


FIG. 16 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

OH12/IH2! (CAL HST 173-100) 37 0 T WING L.S.(RUGW14)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
○	.850	.400	16.050	ALPHA	.000	BETA
◇	.900					
◇	1.000					

RATIO OF LOCAL TO REFERENCE HEAT TRANSFER COEFFICIENT, h/h_{REF}

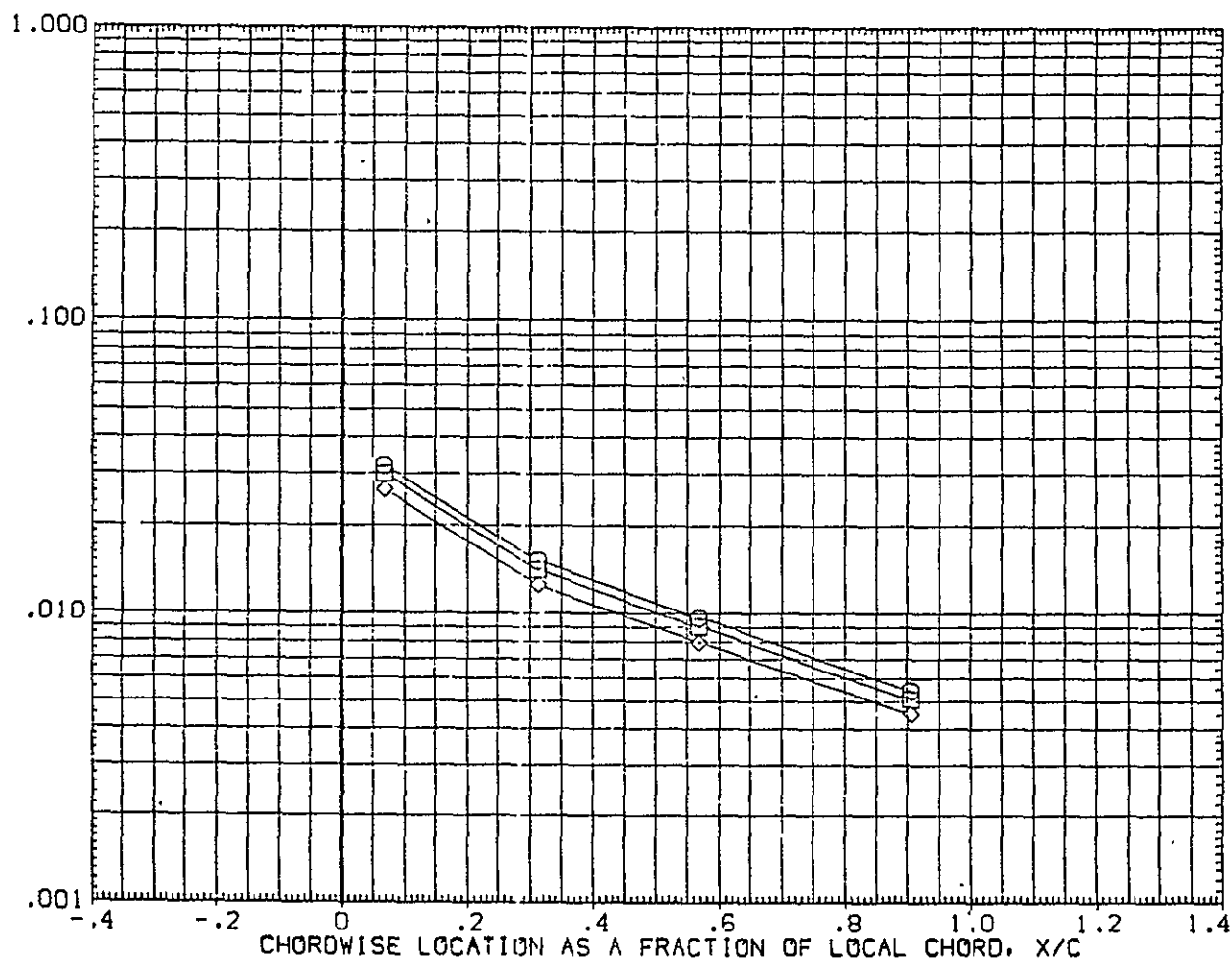


FIG. 16 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

0H12/1H21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW14)

SYMBOL	HAW/WT	ZY/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	.500	16.050	.000		
□	.900					
◇	1.000					

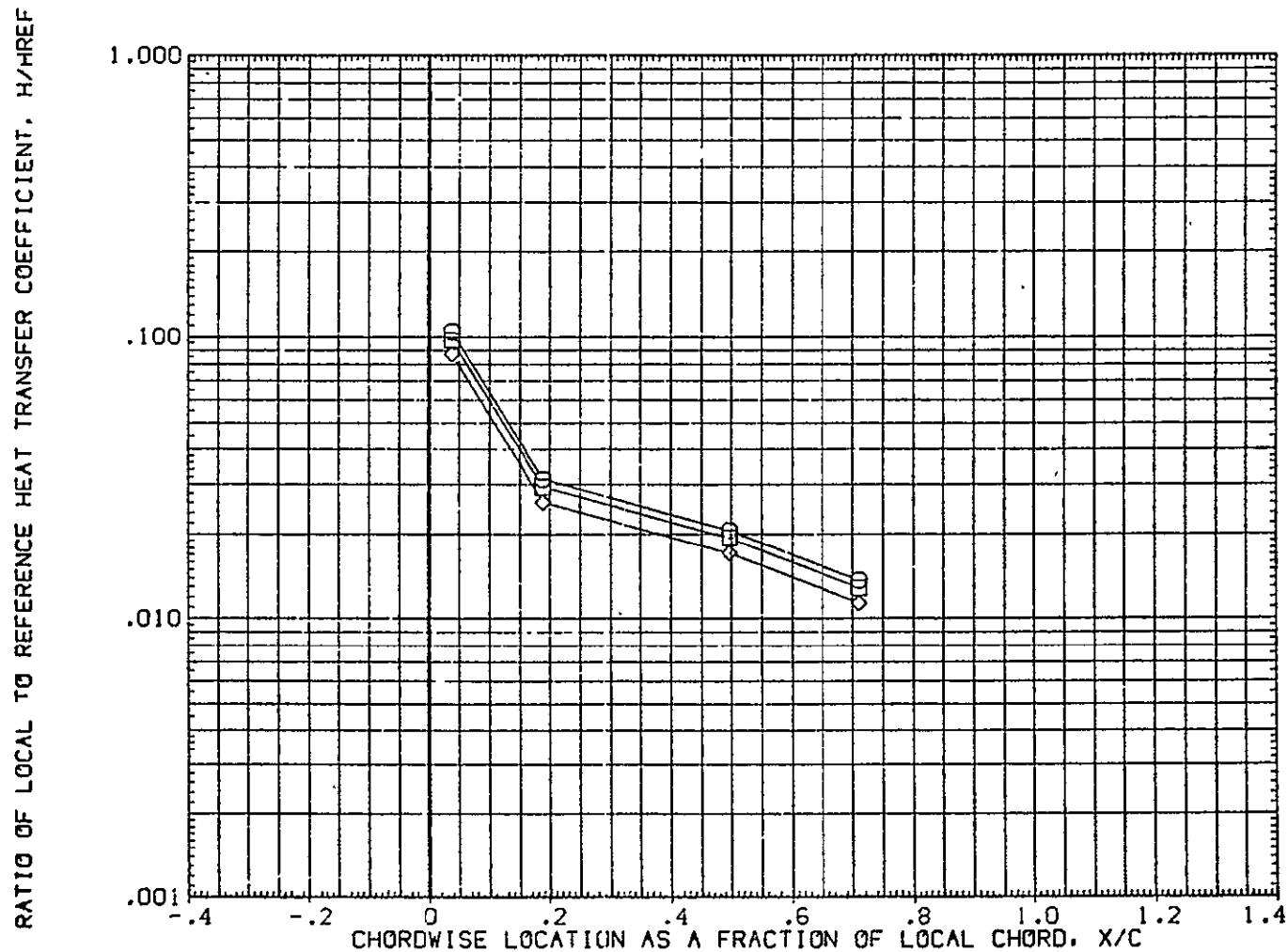


FIG. 16 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW14)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
○	.850	.600	16.050	.000		.000
□	.900					
◇	1.000					

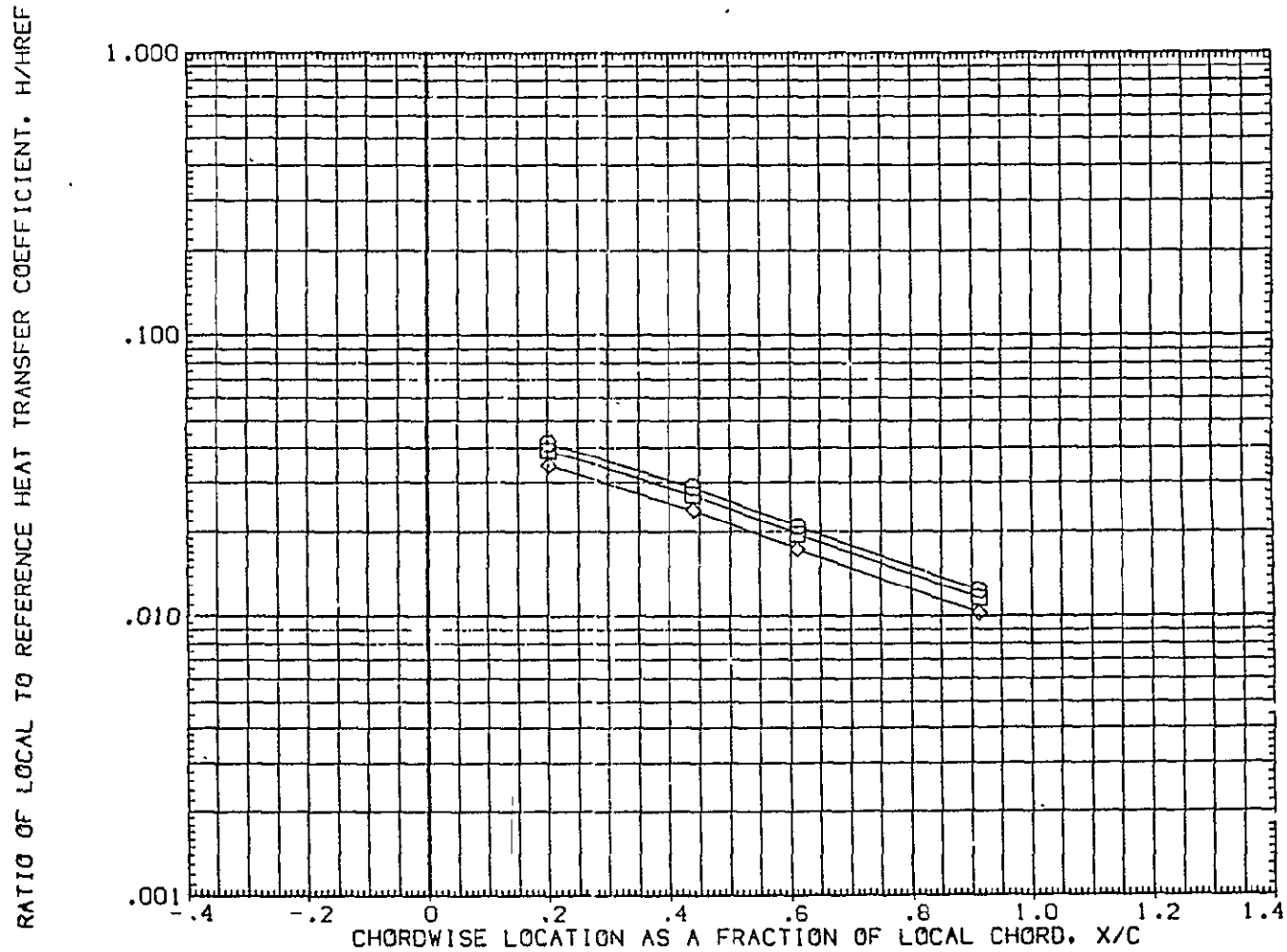


FIG. 16 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OR12/1H21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW14)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
				ALPHA	BETA	
□	.850	.750	16.050	.000	.000	.000
◇	.900					
◇	1.000					

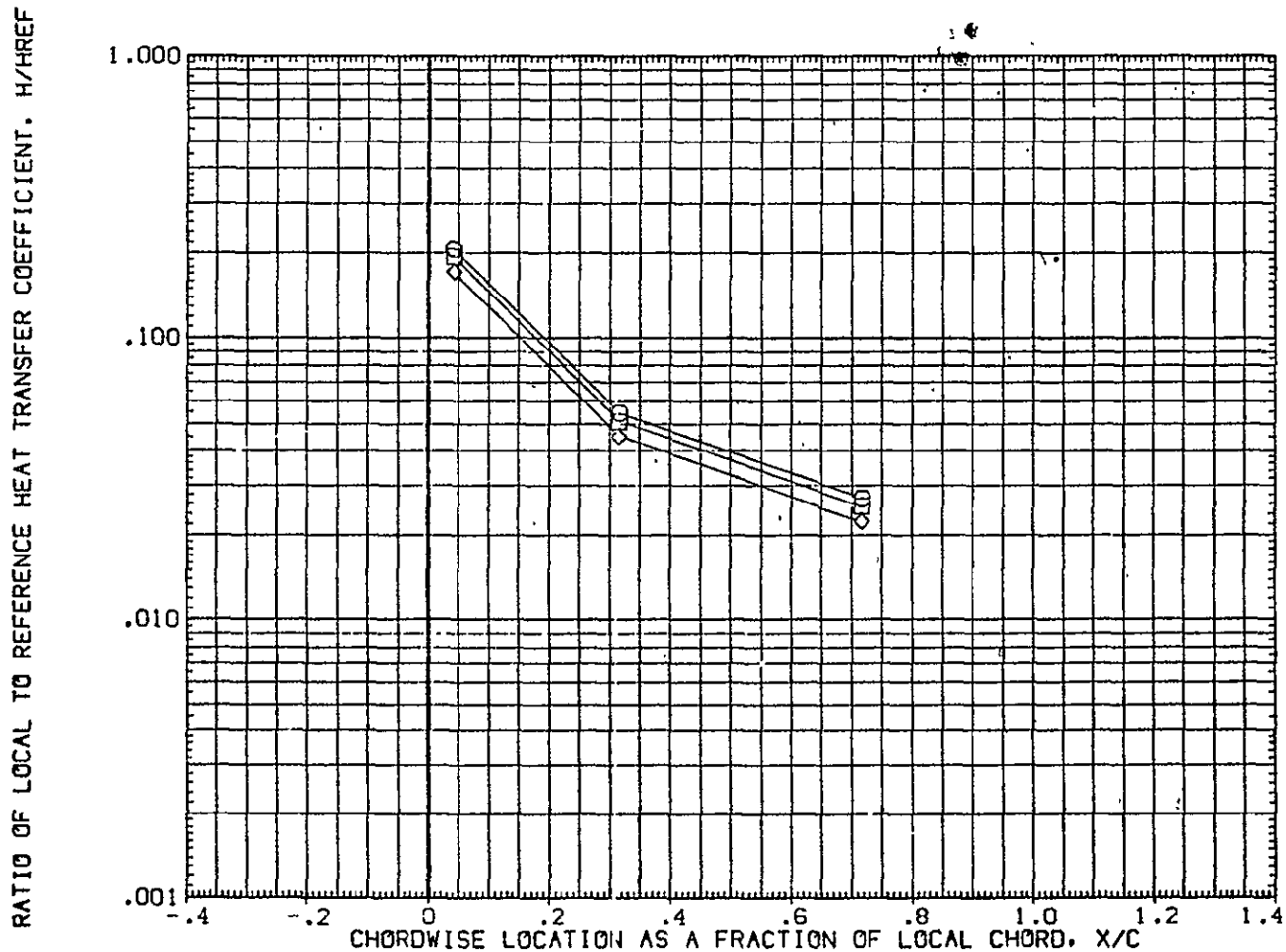


FIG. 16 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER $\alpha = 0$

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ORIGINAL PAGE IS POOR.

OH12/IH21 (CAL HST 173-100) 37 0 T WING L.S.(RUGW14)

SYMBOL	HAW/HT	2Y/B	MACH	PARAMETRIC VALUES		
◇	.850	.950	16.050	ALPHA	.000	BETA
◇	.900					.000
◇	1.000					

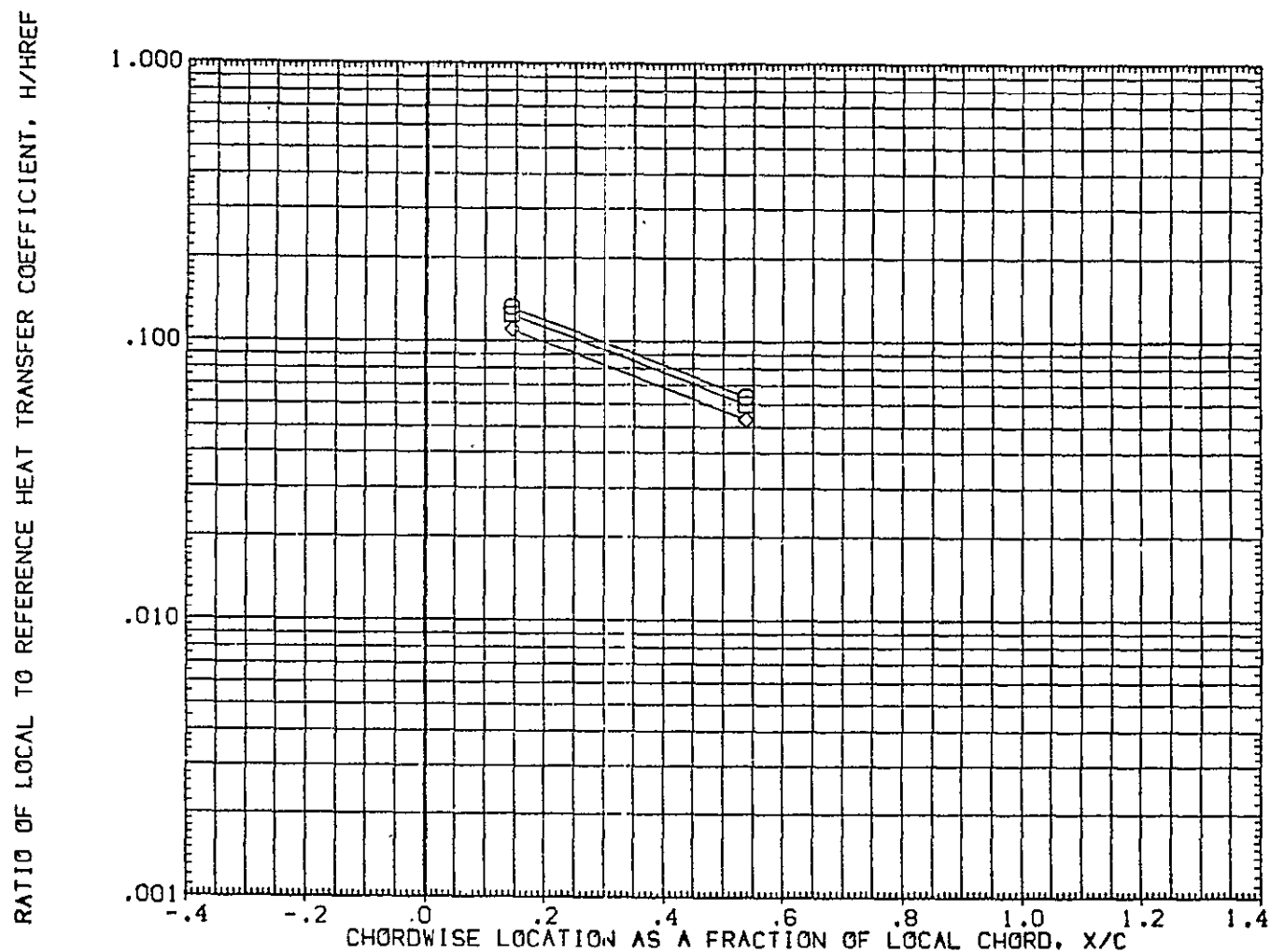


FIG. 16 EFFECT OF RECOVERY FACTOR ON THE ORBITER WING HEAT TRANSFER ALPHA = 0

OH12/IH21 (CAL HST 173-100) 37 0 T VERTICAL (RUGV14)

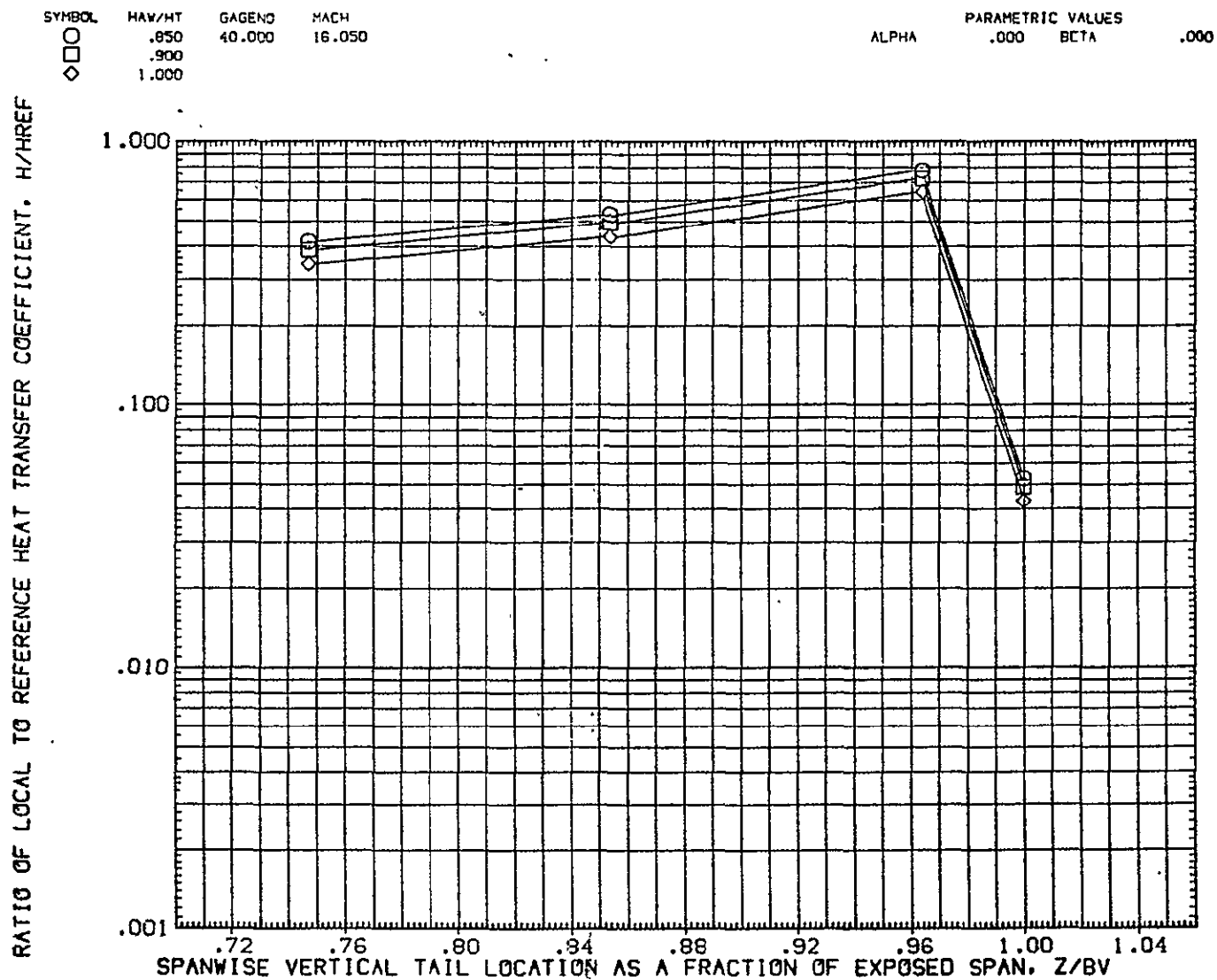


FIG. 17 EFFECT OF RECOVERY FACTOR ON THE ORBITER TAIL HEAT TRANSFER ALPHA = 0